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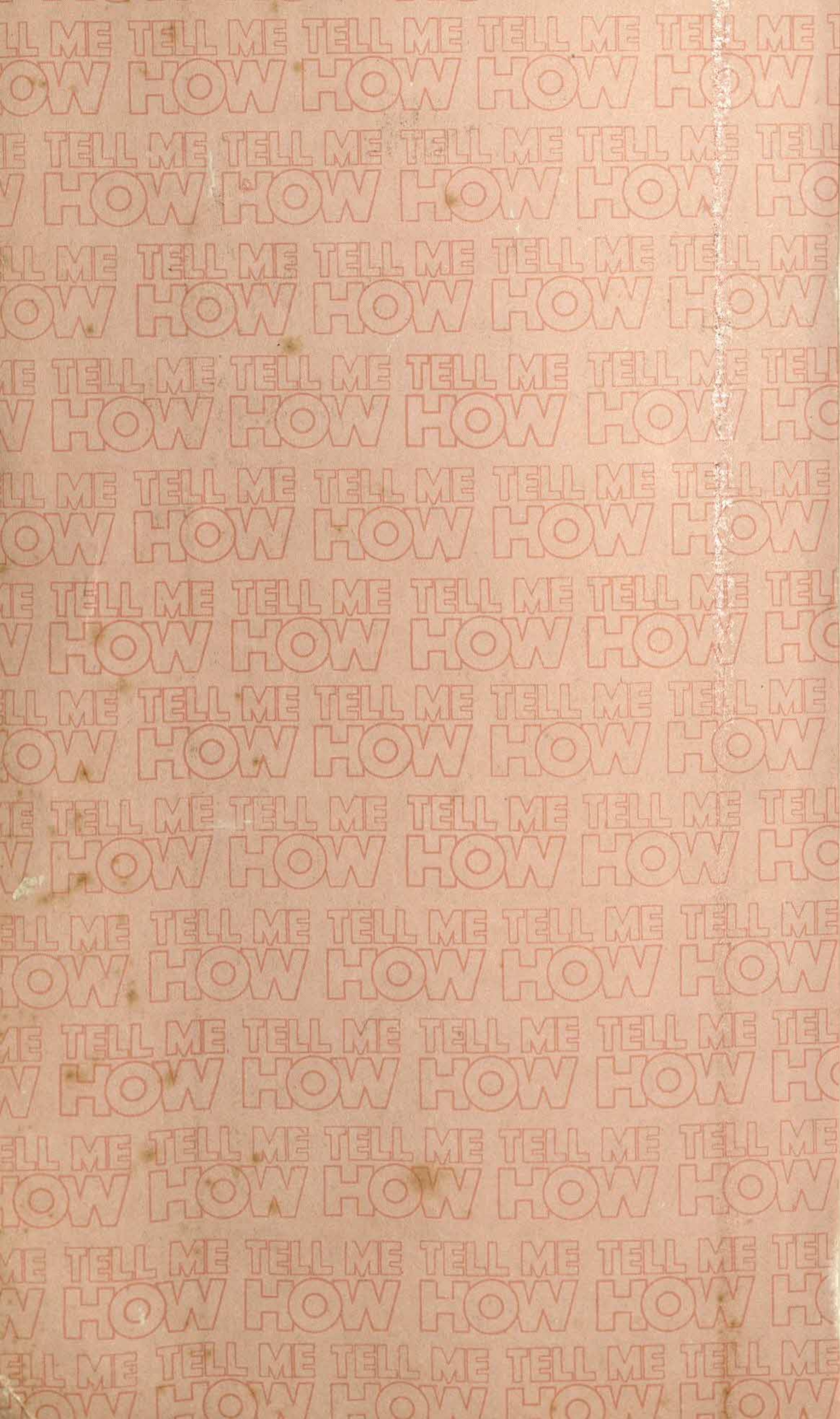
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CONTENTS

GENERAL KNOWLEDGE

Who were the first Gipsies ? 3
How big is an eagle ? 4
Where does china come from ? 4
Who was Nehru ? 4
Can you count the stars ? 5
Who swallowed the Sun ? 5
What are teeth made of ? 5
Butter, cheese or milk ? 6
Why is the summer hot ? 7
Who invented tennis ? 7
Where is the Taj Mahal ? 7
Who invented printing? 8
Who was the 'the Enlightened one' ? 8
What is a diamond ? 9
Why do we dream ? 10
Why do muscles ache after exercise ? 12
Anyone for the shuttle ? 13
Who were the druids ? 14
Who was the founder of modern China ? 16
Why did Gandhi fast ? 17
What are fossils ? 17
What was Alfred Noble's achievement? 18
What does the Skeleton do ? 19
Who stole the British crown jewels ? 21
Where does the term "in the chair" come from ? 22
Why do we need vitamins ? 23
Where does vanilla come from ? 24
Who was the real Robinson Crusoe ? 24
How did the Oscar get its name ? 25
Where does cork come from ? 26
Where do we get the word *denim* from ? 27
Why is lighting three cigarettes with one match said to be unlucky ? 28
What does the appendix do ? 29
Who was Achilles ? 30
Why do we need salt ? 32
How do we see ? 33
Why are some people left-handed ? 34
What is the sun ? 36
Are there such things as fairies ? 37
What is a Dowser ? 39
Who are the Pearly Kings and Queens ? 40
Who was Dick Whittington ? 41

How do oysters make pearls? 43
What are nerves? 44
Who was Lady Godiva? 46
Did King Arthur ever exist? 48
What are thunder and lightning? 50
What causes different skin colours? 51
Why was King Alfred called 'the Great'? 53
What was the Trojan Horse? 54
What is Big Ben? 56
Why do we have hiccups? 56
Why is the word *love* used in tennis? 58
How does a ballpoint pen work? 59
What is dust? 59
What is coal? 61
Why do people have hair? 62
Who was Mrs Pankhurst? 63
What is a tornado? 65
What is the most common surname in the world? 66
What are mermaids? 66
Where did origami come from? 68
How do we hear? 69
What is a Unicorn? 71
Who were the Vikings? 72
Who was Robin Hood? 75
Where is the lost kingdom of Atlantis? 76
What are the Northern Lights? 78
How does the heart work? 79
Who is Anastasia? 81
What is an albino? 82
How old are rockets? 83
How many sets of teeth we grow? 84
Why is hat-making called millinery? 85
Why do we need water? 86
What is Stonehenge? 87
Who invented Photography and when? 89
What are reflexes? 90
What is taste? 90
What is balance? 91
Who invented the first thermos flask? 92
Who invented the thermometer? 92
What is the origin of the Marathon race? 92
Who was Sir Isaac Newton? 93
Where is Tower of London? 93
What is Vedic? 94
How did Chess begin? 94
How does a submarine stay under water? 95
Why doesn't one key open every door? 95
Why do soldiers wear Khaki? 96

Who invented the Match ? 98
Who invented the cigarette ? 99
What would we do without salt ? 100
What would we do without Coal ? 101
What would we do without Soap ? 102
What would we do without Wool ? 103
Which American President was born in a log cabin in Kentucky ? 104
Who was Indira ? 104

THE EARTH

Is the earth perfectly round ? 109
Is there a place where the sun never sets ? 109
What is a volcano ? 111
What causes tidal waves ? 113
What is a cyclone ? 114
Where is the Earth ? 116
How does the Earth keep warm ? 118
Why are there waves on the sea ? 118
What causes the changes of sea-level ? 119
Why does a volcano erupt ? 120
Where do you find volcanoes ? 121
Can rocks bend ? 123
How do geologists help us ? 125
What are ores, and where might you expect to find them ? 126
How do animals and plants depend upon each other ? 128
Which animals and plants are in the most danger ? 130
Who are the vanishing peoples of the world ? 132
Is fresh air really fresh ? 134
What does the future have in store for our planet ? 136

ASTRONOMY

What's the difference between a Star and a Planet ? 141
How are clouds formed ? 142
What is a shooting star ? 143
When will the Earth die ? 144
Is there life on other planets ? 145
How many stars are there ? 147
How hot is a star ? 148
How far away are the stars ? 148
Does a comet foretell disaster ? 149
Why are stars grouped in constellations ? 150
What is a nebula ? 151
Where and what are the galaxies ? 151
What are quasars ? 152
Why doesn't the sun shine at night ? 152

EVOLUTION

Is there life on other planets ? 157
What is a fossil ? 158
Which fossils are you most likely to find ? 159
What was the first life on Earth ? 160
Which animals are among the largest that have ever lived ? 162
How long has man been walking the Earth? 164
What is the importance of plants in life's framework ? 166
What kinds of tools did early man use ? 167

ANIMALS

How are snakes charmed ? 173
What are aphids ? 174
Do sloths sleep all the time ? 175
What are amphibians ? 176
What did the dinosaur have for breakfast ? 177
Did dragons ever exist ? 178
Why do birds migrate ? 179
How do insects breathe ? 181
Do fish sing ? 182
What colour is an insect's blood ? 182
How fast can birds fly ? 183
Why is the animal called a pig, and its meat called pork ? 183
What fish swims standing up ? 184
Is there an animal which has three eyes ? 185
Do mice really like cheese best ? 185
What is the most poisonous snake in the world ? 186
What is a mammal ? 187
What are flatfish ? 188
What is a marsupial ? 189
How do snails walk ? 190
How many kinds of insect are there ? 191
How do spiders spin their webs ? 193
How do fish taste ? 194
Are all snakes dangerous ? 196
What does cold-blooded mean ? 197
The Loch Ness monster - does it exist ? 198
Why do dogs bury bones ? 199
Are elephants afraid of mice ? 200
Why does the camel have a hump ? 201
What is the difference between alligators and crocodiles ? 203
How dangerous are Crocodiles ? 203
Which is the thickest snake in the world ? 204
What is the largest lizard in the world ? 205

Do snakes eat snakes ? 206
What is the largest living bird ? 207
Why do flamingos have bent beaks ? 207
What is swan-upping ? 208
Where do Golden Eagles nest ? 208
What is falconry ? 209
How does the Secretary bird catch snakes ? 210
What is the difference between pigeons and doves ? 210
Where do budgerigars live in the wild ? 212
How long is the woodpecker's tongue ? 213
What is the Australian teddy bear ? 213
Which mammals really fly ? 215
What are solenodons ? 215
Which is the difference between monkeys and apes ? 216
Which animal spends its life upside-down ? 216
Where do chimpanzees sleep ? 217
How far can a jerboa jump ? 217
What makes whales mammals ? 218
Do whales spout water ? 218
Which dog cannot bark ? 219
How many wolves are there in a wolf-pack ? 219
Which bear wear 'glasses' ? 220
Can an Elephant drink through its trunk ? 220
Why are Zebras striped ? 221
What does a Camel store in its humps ? 221
Do all Camels have humps ? 222
What is the Okapi ? 222
Why is the Pronghorn so called ? 223
How long is the Giraffe's tongue ? 223
What is the largest living land mammal ? 225
Which hoofed mammals are odd-toed ? 226
What are sponges ? 226
How do sponges feed if they cannot move ? 227
Where do bath sponges come from ? 228
What is Coral ? 228
How are Coral reefs formed ? 229
What is a Cuttlefish ? 230
Is an Octopus dangerous to man ? 231
What are copepods ? 232
Why does the Hermit crab live in a shell ? 233
How many legs has a Centipede ? 233
What is the difference between a Centipede and a Millipede ? 234
How fast can a dragonfly fly ? 234
How do locust swarms start ? 236
Which insects build enormous mounds ? 236
How does a termite colony start ? 237
How do butterflies lay their eggs ? 238
What is the King Crab ? 238

Can a scorpion kill a man ? 239
How does a starfish move ? 240
Do all spiders spin webs ? 241
How does a starfish open a mussel with its feet ? 241
What do skates eat ? 242
How dangerous is the stingray ? 242
How does a sea cucumber avoid attack ? 243
What is the largest freshwater fish in the world ? 243
What are hatchet fishes ? 244
Which goldfishes are freaks ? 244
Is the dolphin a fish or a mammal ? 245
Which fish spits at insects ? 245
Do fighting fishes fight ? 246
What is dangerous about the scorpionfishes ? 246
Can frogs fly ? 247
What is the difference between frogs and toads ? 247
When is a turtle a tortoise ? 248
Are snakes really modified lizards ? 249
How does a snake swallow its prey ? 249
Does a Boa Constrictor crush its prey ? 250
How dangerous is the Adder ? 250
What animal can run fastest ? 251
Where did Teddy Bears come from ? 251

ABOUT OURSELVES

What causes a dimple ? 255
Why does a hair-cut not hurt ? 255
Why does water not soak into our skin ? 255
How many hairs grow on the human head ? 256
How do we catch a cold ? 256
Why is sea air good for us ? 256
Is soap and water good for the skin ? 257
What is heart-burn ? 257
Why do we get electricity in our hair ? 257
Why do some people walk and talk in their sleep ? 258
Why do our faces turn red when we do something wrong ? 258
How do "goose pimples" form ? 259
Why don't we laugh when we tickle ourselves ? 259
Millions of people wear spectacles but how did they develop ? 260
Why does hair turn grey ? 260
What is more important in keeping us alive, food or water ? 261
Why don't men have tails ? 261

THE WORLD AROUND US

How much salt is there in the sea ? 265
Are all deserts hot ? 265
How does a magnet work ? 266

Who are the Cossacks ? 267
What is show-jumping? 268
Where is the world's oldest underground railway? 270
What is an aviary ? 271
What is a lightship ? 272
Who are the Bedouins ? 272
What is an electrocardiograph? 273
What do guide-dogs do ? 274
How do our lungs work ? 275
How is paper made ? 276
How fast can a dog run ? 276
Why is the British flag called the 'Union Jack' ? 277
What do charts tell us ? 278
Where is the Pampa ? 279
When did the first electric train appear ? 279
What is a rack railway ? 280
What is our skin made of ? 281
Can trains run without rails ? 282
How do astronauts 'walk' in space ? 283
Who founded the Red Cross ? 284

EXPLORATION AND DISCOVERY

What is the smallest country in the world ? 287
Who discovered America? 287
Who was Marco Polo ? 288
Why did Columbus sail Westwards? 289
Which Europeans first landed in Australia? 290
Who was the first explorer known by name ? 290
Who discovered Newfoundland? 291
Why is the Cape of Good Hope so called ? 292
Who was the first explorer of the Sahara ? 293
Why is the Amazon River so called ? 293
Who was Australia's most famous explorer? 294
How did the Sturt Desert get its name ? 295
Who discovered the Mississippi River? 296
Who discovered the source of the Nile ? 296
Who were the Pilgrim Fathers? 297
What was 'El Dorado' ? 298
Who first reached the North and South poles ? 299
Who first reached the poles by aircraft ? 300
How did New York get its name ? 301
How did Australia's sheep industry begin? 302
Who first explored Central Australia? 302
Which pirate was also an explorer ? 302
Who gave the Colony of Virginia its name ? 303
When were the first products brought
back from the New World ? 304

Why are Australians called ‘Diggers’? 305
How is man exploring outer space? 306

THE PAST

Who was the Elephant Man? 311
When were bricks first used? 312
What is a ‘motte and bailey’ castle? 312
Who popularized mountain climbing? 314
Who were the ‘Bird Men’? 314
When was history made in twelve seconds? 315
Which was the largest battleship ever built? 316
What happened to the men of the *Mary Celeste*? 317
What was the Boston Tea Party? 318
Where is tea-drinking a time-honoured ritual? 319
What is the significance of the date 2 June 1953? 320
What was the Indian Mutiny? 321
Why was Africa the centre of the slave trade? 322
Who wrote the American national anthem? 324
What are mosaics? 325
Who was the first Prime Minister of the Commonwealth of Australia? 325
What is Sanskrit? 326

BOOKS

What were the real names of the three musketeers? 331
Why is there a dodo in *Alice in wonderland*? 332
Who wrote the book *Moby Dick*? 333
What is the name of the private detective whose adventures were written by Raymond Chandler 335
Who wrote, illustrated and then published at her own expense *The Tale of Peter Rabbit*? 336
What famous mystery novel was left unfinished by which well-known author? 337
Which notorious duellist was also an author and playwright? 337
Who wrote the *The Swiss family Robinson*? 338
Who was the Army Nurse who won fame by writing books for girls? 339
Which queen’s favourite started to write *The History of the world* while awaiting execution? 339
Who was the first American Author to achieve international fame? 340
Why did Arnold Bennett write under the nom-de-plume of "Gwendolyn"? 341
When was *The Arabian Nights Entertainments* first written? 342
Who was the English Baron who liked to use the words "The Last" in the titles of his books? 343

Who wrote 66 best-selling mystery novels in 56 years ? 343
What is the name of the priest who is famous for solving mysteries ? 344
Who was The Last of the Mohicans ? 345
Who wrote a book about The Son of Aladdin ? 347
Who was O Henry ? 347
Who wrote the famous fairy story *Cinderella*? 349
Who wrote under the nom-de-plume of Saki ? 350
Who was Christopher Robin's father ? 350
Which author wrote three books, each containing the word beau in its title ? 352
Who was the oyster Pirate whose books became famous ? 353
To whom does *The Swan of Avon* refer ? 354
Who wrote the *BulldogDrummond*Novels? 354
What was the only book for which onathan Swift, who wrote scores of books, was paid ? 355
Which French poet was the hero of the very popular operetta *The VagabondKing* ? 356
Who - when asked by a customs officer "What have you declare ?" replied "only my Genius" ? 358
Three Men In a Boat is one of very few humorous classics but who wrote it ? 358
Who wrote the two baffling mystery novels, *The Woman in white* and *TheMoonstone*? 359
When Sir Walter Scott was made bankrupt, how did he pay off his debts ? 359
*FirstImpressions*was the title Jane Austen gave to her first book but under which title was it published ? 360
Who wrote the book on which the world's most popular opera was based ? 361
The Virginian has been filmed but who wrote the book ? 362
The Contemporary accounts of Julius Caesar's wars in Gaul and Britain were written by whom ? 362
Who is Ian Fleming's famous hero, featured in many films ? 363
Who was the French Forest Ranger famous for his fables ? 364
Did Rob Roy really live ? 364
Which poet Laureate was said to have worked himself to death ? 365
Whose novel about English country life was praised by a British Prime Minister ? 366
By which name do we know Theodor Jozef Konrad Korzeniowski? 368
What are the first and last sentences in the Bible ? 369
Who gave four white feathers to Harry Faversham ? 369
Is there any connection between Captain Blood and Colonel Blood ? 371
Who wrote *The One Hundred and One Dalmatians* ? 371

Who was Shere Khan ? 372
In which two books by Robert Louis Stevenson is David Balfour the Hero ? 372
The English poet who wrote *La Belle Dame Sans Merci* died when he was only 26. Who was he ? 373
What were the christian names of the Three Bronte Sisters ? 373
Who wrote the famous Biography of Dr. Samuel Johnson ? 373
To whom in the Bible did Jesus say: "Fear not, Henceforth thou shaltcatch Men" ? 373
Lord Byron enlisted in a foreign army and died later in the Army's country. What country ? 373
What are the names of the Fairy King and Queen in Shakespeare's play *A midsummer Night's Dream* ? 374
What was Thomas Hardy's first profession ? 374
What did Wynkyn de Worde do ? 374
Who were the two men who went round the world in eighty days in Jules Verne's great book ? 374
Who wrote the book on which Walt Disney's film *The Sword and the Stone* is based ? 374
What famous battle described in William Makepeace Thackeray's novel *Vanity fair* ? 375
Who wrote *The Canterbury Tales* ? 375
Which king of Great Britain wrote a book about tobacco ? 375
Which was the book hailed as "The best book about Wales" ever published ? 375
Which poet was Oliver Cromwell's secretary for foreign tongues ? 375
What film-of-the-book won nine awards by the Academy of Motion Picture Arts and Sciences in 1939 ? 376
What are the names of the three boys in the novel *The Coral Island* and who wrote it ? 376
In the Bible what are the names of the three wise men ? 376
Who created Mary Poppins ? 376
Who lived at Dove Cottage in the English lake district ? 377
What was Richard Henry Dana's most famous book ? 377
Who wrote the words of *Rule Britannia* ? 377
What was Bram Stoker's most famous book? 377
Ginger and Merrylegs appear in which book by Anna Sewell ? 377
In whose book does a female vampire appear ? 378
Who created Sherlock Holmes ? 378
Who was Mark Twain ? 379
Who wrote The Wind in the Willows ? 380

FASCINATING FACTS 383

QUIZ 395

GENERAL KNOWLEDGE

Who were the first Gipsies?

In about the tenth century, groups of people began to leave northern India and to travel all over Europe. Being very independent, they kept their original language to a great extent - this is what we now call Romany, and it is a descendant of a form of Sanskrit.

Gipsies' beliefs are basically Christian, but they also have a very complicated set of superstitions and legends. Gipsies are still extremely independent, and insist on their right to live as nomads in their wagons and caravans. There are few real gipsies about these days - most of Britain's nomadic people are not fully Romany at all, but *did-dikai's*, or half-breeds, as the full Romanies call them. Gipsies first came to Britain in the early sixteenth century.

How big is an eagle?

The eagle is the Rolls Royce of birds. The soaring, stately flight of this rare creature is a wonderful sight. This is the golden eagle, which is about 80 cm (2ft7in) long with a wingspan of about 220 cm (7ft 3in) - some eagles are bigger. Eagles have been hunted by people and are now rare.

Where does china come from?

China clay, or kaolin, is usually mined from pits like this, for making pottery, or china, as well as other things such as plastics. To make porcelain (the finest kind of china) it is fused with china stone, or petuntse, at very high temperature.

Who was Nehru?

Jawaharlal Nehru (1889-1964), was the father of the Republic of India. He came from an upper-class family and studied in England before returning to India in 1912. He became a close associate of Gandhi in the National Congress party which was devoted to gaining independence from Britain. Pandit (a title meaning 'learned man') Nehru, however, believed that socialism and industrialization should be India's aims rather than the rural programme of Gandhi. Nehru was prime minister of India from independence in 1947 until his death. He was a world statesman and leader of the non-aligned nations (not closely linked to the Soviet Union or the USA), who was loved in his own country and respected throughout the world. His daughter, Mrs. Gandhi, was to fill her father's position after his death.

Can you count the stars?

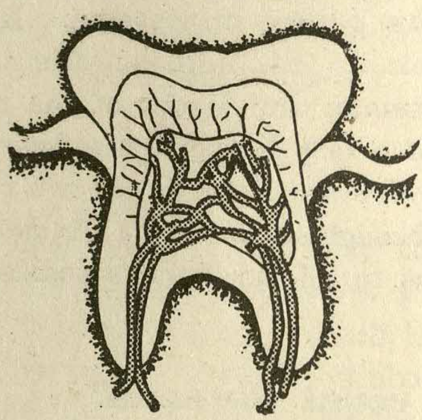
On a very clear night it may be possible to see over 1000 stars without a telescope. No one knows how many stars there are in the universe.

Who swallowed the Sun?

When the Moon blocks the Sun from view, it is called an eclipse of the Sun (a total eclipse is, in fact, a rare event). In ancient times, when Sun and Moon were worshipped as gods, an eclipse was terrifying. One ancient Chinese explanation was that a dragon had swallowed the Sun.

What are teeth made of?

There are four different substances which make up our teeth, and each substance has its own job to do. The hard and shiny white substance which covers every tooth is called *enamel*, and this protects the tooth from the bacteria which can cause decay. Lower down the tooth is a substance like bone which protects the root of the tooth. This is called *cementum*. Beneath the enamel is a material called *dentine*, which is a little like ivory, and which makes up the main body of the tooth. At the tooth's centre is a space filled with dental *pulp*. This pulp contains the blood vessels and nerves that keep the tooth alive and can cause it to hurt if bacteria manage to get through the two outer substances. This can be prevented if you take good care of your teeth, and there is every reason to do just that, isn't there? Who wants rotten and painful teeth?



Butter, cheese or milk?

Cows are very valuable animals to human beings. They give us milk, from which we make butter and cheese. The commonest dairy (milk-giving) cows are Friesians. Europeans drink an average of nearly 31 (5 pt) of milk per week each.

Why is the summer hot?

The Earth takes one year to circle around the Sun. But the Earth is titled, so that at different times of year some parts receive more sunlight than others. These changes give us the seasons. On the equator, the Earth's tilt makes little difference, and there is no great change in the seasons.

Who invented tennis?

The indoor game of 'real'tennis was played in the Middle Ages. During the 19th century it overflowed on to the lawn, where players made up their own rules. In 1874 Major Walter Wingfield invented rules for lawn tennis. Even by 1890, however, 'real' tennis rackets were still being used.

Where is the Taj Mahal?

Many people think this is one of the most beautiful buildings in the world and it is regarded as the finest example of Islamic architecture. It was built on the Jumna River near Agra in India by Shah Jahan, emperor of India, between 1631 and 1653 as a tomb for his wife Mumtaz Mahal ('Jewel of the Palace'). The whole building is covered with white marble inlaid with coloured stones in abstract patterns. It stands on a rectangular platform 580 m (635 yds) by 304 m (333 yds) and the whole edifice is reflected in a pool lined with cypress trees. According to tradition, it is best to see it by moonlight.

Shah Jahan, who reigned from 1628 to 1666, belonged to the Mughal dynasty, and his court was famous for its artists, especially painters.

Who invented printing?

In ancient China, words were printed by cutting the symbols in blocks of wood. The Chinese later invented movable type, a process in which letters are made separately and assembled to form words. However, successful printing with movable metal type (letters) in Europe was not invented until the 15th century. The man usually called the inventor of printing was Johannes Gutenberg (*c.* 1398-1468), a goldsmith from Mainz in Germany. Before that, all copies of a book had to be written by hand, often by monks. Printing made books far cheaper and easier to obtain because copies could be produced quickly.

Who was the 'the Enlightened One'?

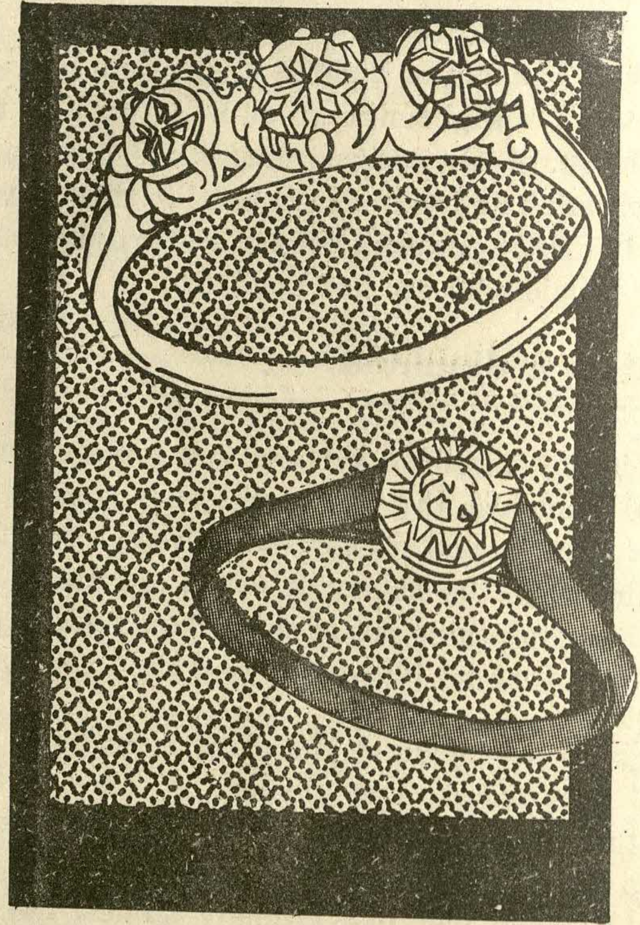
Buddhism is not a religion so much as a way of life, as it has no god and no prayer. Buddha, which means 'the enlightened one', was Gautama Siddhartha who founded the religion about 528 BC. He came from an aristocratic family in northern

India. Having decided that worldly success meant nothing, he had a vision one night, as he sat under a Bo tree, which became the foundation of his teaching. The aim of Buddhism is to gain *nirvana*, a state of enlightenment gained through the extinction of all desires. Buddhists believe in reincarnation and that acts in this life affect future lives. It is still a powerful religion, and has influenced many people who are not Buddhists.

What is a diamond?

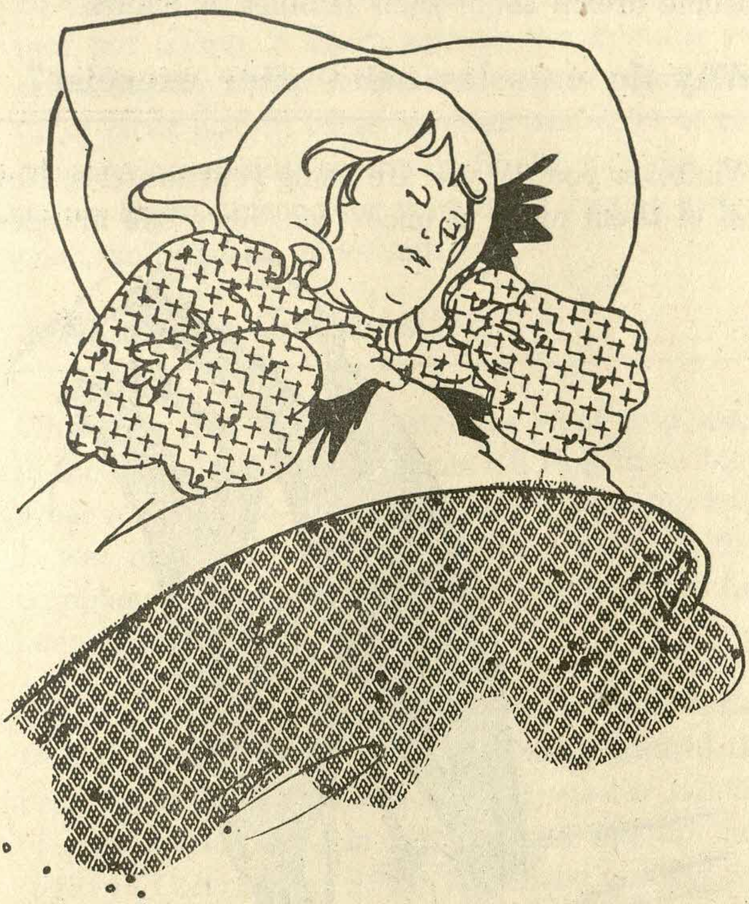
Look in any jeweller's window, and you are bound to see diamonds, the white, glittering gems which are so valuable and so beautiful to look at. It's hard to think that the diamonds which sparkle in the shop windows came out of the ground as lumps of dull rock, isn't it? But this is how they are found.

Diamonds are made of the same element as the 'lead' in a pencil. This element is called carbon, but the diamond's carbon is in a different form. When rough diamonds are found, they look very uninteresting, just like ordinary stones, but the jeweller knows how to cut the stone so that it has many faces or *facets*, which catch the light and make the diamond sparkle. Diamonds are very valuable, not only for their beauty, but also for their hardness. They are the hardest known substance in the world. This means that they can be used for wide variety of purposes in industry, but those which 'work' are called industrial diamonds, and are cut differently, making them not nearly as beautiful as the gem stones which go into rings and necklaces. Did you know that, because a diamond is so hard, it can only be cut with another diamond? No knife will do the job.



Why do we dream?

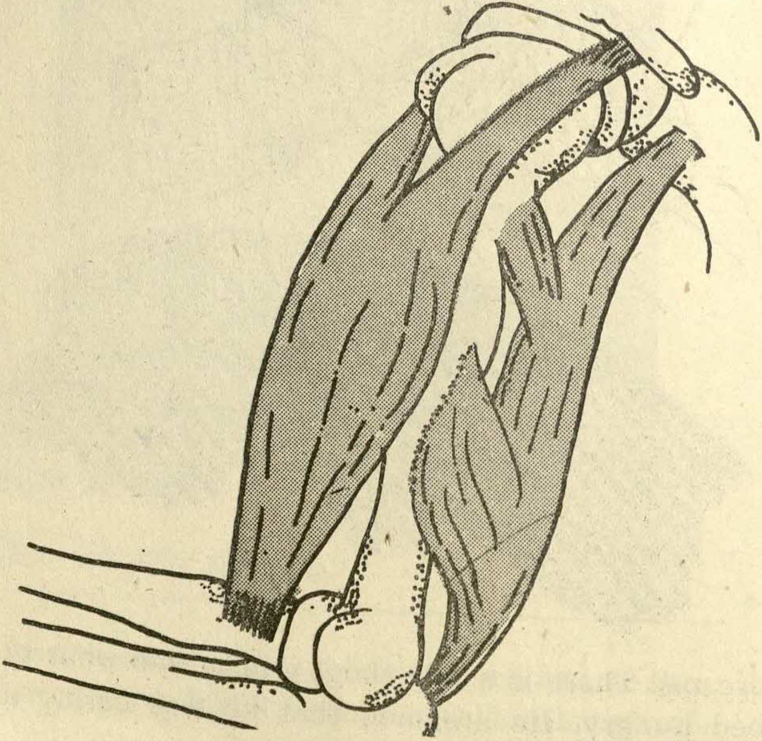
Nobody knows exactly *why* we dream when we sleep. All we know is that everyone dreams, although most dreams aren't vivid enough for us to remember them when we wake up. Dreams are not messages from other world, or prophecies of what may happen in the future, but very often the result of what we have been thinking about when we were awake, sometimes without us realising that we are thinking about it. For example, if we go to bed tired, cold or hungry, these feelings may well appear in our



dreams. There is a tale about a man who went to bed hungry. He dreamed that he was eating a breakfast cereal, and when he woke up, he found that he had eaten some of his mattress! This is almost certainly not a true story, but it shows you an example of this link between our emotions and our dreams. We may also have dreams about the things we like best, or nightmares about the things we hate or fear. This is why many young children dream about fairies or witches, and why homesick people dream about their families or homes.

Why do muscles ache after exercise?

Whatever you do, you are using your muscles. Not all of them move at once - you have 639 muscles



in all - but you would be surprised to know how many of your muscles you use doing something as simple as walking.

When your muscles are working, they produce an acid called lactic acid, which makes the muscles feel tired. When you rest, your body gets rid of the lactic acid, and you don't feel so tired. When you do a lot of hard exercise, like running a race, you may get cramp, a sharp pain in the muscles you are using the most. Cramp is caused by a big build up of lactic acid in these muscles, and a lot of rest is needed to get rid of the cramp. So although exercise, as we know, is good for your body, rest is just as good, and just as important.

Anyone for the shuttle?

When the first manned satellites went into space in the early 1960s, many people felt that the wildest dreams of science-fiction writers were coming true. It was only about 50 years earlier that the first aeroplanes had flown. What amazing progress had been made in half a century!

But in the next 20 years events moved still faster. In the USA two special achievements marked the progress of space exploration. First was the landing of men on the Moon in 1969; second was the first flight of *Columbia* in 1981. The Moon landing was a more sensational event, but *Columbia* was probably more important for the future space exploration.

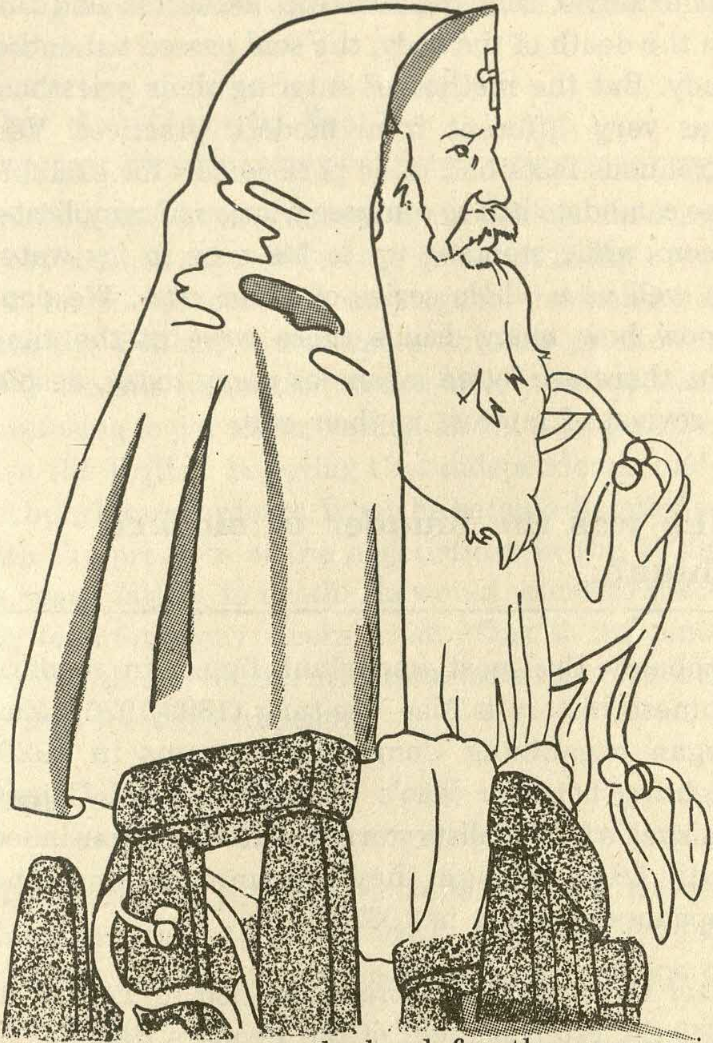
For *Columbia* was the first reusable space vehicle · the first in a shuttle service between the Earth and space.

She looks like a fast, stubby aeroplane, and that is essentially what she is. She can manoeuvre in space, releasing satellites from her roomy hold or picking up old satellites from their orbits, and she is a flying laboratory herself. Re-entering the atmosphere, she is protected from the enormous heat by special heat-proof tiles. She lands on a runway like an aeroplane, using a parachute as a brake.

In space travel, enormous power is needed for the actual launch; once in orbit, you need only a tiny fraction of the power it took to get you there. For take off, *Columbia* is attached to a massive fuel tank and two great booster rockets. The boosters do most of hard work of launching, and when they burn out they are released and parachute into the ocean to be picked up and used again. The giant tank, the only part which cannot be reused, falls away close to orbit altitude and burns up as it descends.

Who were the druids?

The druids were the priests of the Celtic people who lived in Britain before the Romans came. It is thought that these people arrived in Britain in 500 B.C., when Stonehenge was itself a thousand years old. The druids worshipped trees such as oak and the rowan, and especially the mistletoe, which was supposed to hold the life of the tree when in winter the tree appeared to die. It is doubtful whether the druids used Stonehenge as a temple as modern druids do today on Midsummer's day. They preferred woods and other leafy places to worship in, and



this made it extremely hard for the conquering Romans to find them and stamp out their religion.

In fact they were never completely wiped out, the Romans deciding that it was better to tolerate them than to attempt the impossible task of getting rid of them altogether. Some of the druids' beliefs were similar to those of modern religions. They believed, for example, that the soul was immortal, and that on the death of the body, the soul passed to another body. But the method of entering their priesthood was very different from modern practices. Very strenuous feats had to be performed - for example, the candidate had to compose a long and complicated poem while standing up to his nose in icy water, as well as a whole series of other rites. We don't know how many druids there were at the time, but there are by no means as many today, despite a revival of interest in their cult.

Who was the founder of modern China?

Probably the most important figure in modern Chinese history is Mao Tse-tung (1893-1976). Mao began organizing Communist groups in 1920. Fighting between Mao's Communists and Chiang Kaishek's Nationalists started in 1927 and continued until 1949 (though they did unite against the Japanese invaders in 1937).

After the Nationalist forces had fled to Taiwan in 1949,the establishment of the People's Republic of China was proclaimed with Mao Tse-tung as its leader. The new government transferred the land from the landowners to the peasants and established heavy industries. In the late 1950s communes were established to coordinate planning in agriculture, industry, defence and education. Mao remained the driving force behind the development of China until his death.

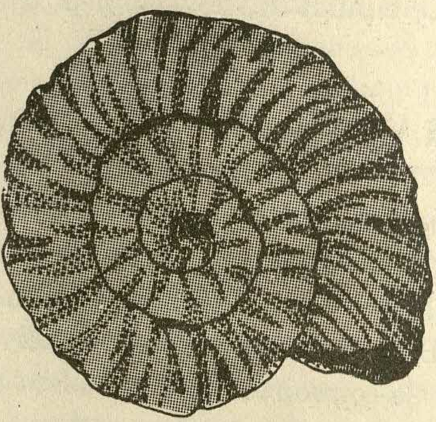
Why did Gandhi fast?

Gandhi (1869-1948), known as Mahatma meaning 'great soul', is regarded as the father of India. From 1919 he led the country's campaign for independence from the British, which was eventually granted in 1947. He was committed to non-violent action, such as refusing to pay taxes, strikes, and non-cooperation with the British, believing that independence could not be achieved by force. When he became dissatisfied with the progress of the negotiations in the 1930s, he began fasting to death. He would refuse to touch any food for many weeks in an effort to influence the British and to gain attention and support among Indians for the campaign.

What are fossils?

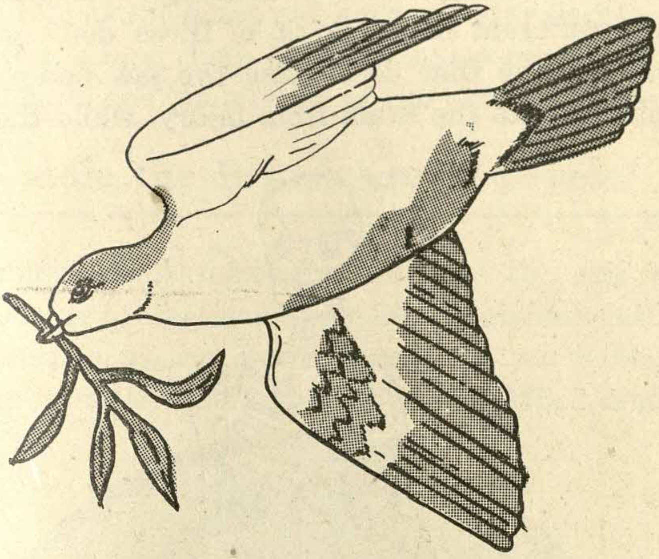
Fossils are the petrified remains of living things. There are three types of fossil, and each type is useful in telling us how creatures lived millions of years ago.

The first type of fossil is part of the body of the creature, usually the hard part of the body like the shell or the skeleton, which is preserved as it was originally. The second type is a mould of the creature's body, left in rock after the body itself has decayed, so that we can see exactly how the creature looked. The last type is the imprint of the animal's footprint in the clay or mud which has hardened into rock over the years. All these types of fossil are very useful for telling us what sort of animals lived on the earth millions of years ago, animals which have long since died out or changed slowly as time passed to adapt themselves to different conditions.



What was Alfred Nobel's achievement?

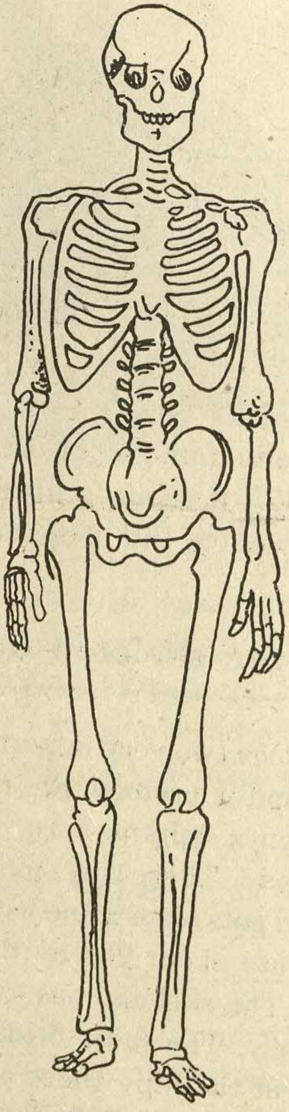
You've probably heard of the six famous Noble prizes, awarded every year to the people who have made outstanding contributions to medicine, physics, chemistry, literature, economics and peace. Alfred



Nobel was made famous because he invented dynamite in 1867. It seems a little odd, doesn't it? A peace prize bearing the name of the inventor of dynamite!

What does the skeleton do?

The skeleton does two very important jobs. It holds the body up, and it protects the delicate organs of the body. When a baby is born, it has about 270 bones in its body. These are small and quite soft, and as the child gets older some bones fuse together, so that there are about 206 by the time the child is fully grown. The skeleton has joints which enable it to move easily. The most flexible joints are the ones like that at the hip - these are called ball and socket joints. Other joints don't move at all - the skull is an example of this. Although it is made of many different bones, most of these don't move, the only one that does being the jaw bone. The skull protects the brain from injury, while the rib



cage protects the heart and lungs, and the backbone (which is a long chain of small bones) protects the spinal cord, the 'main road' of the nervous system.

Who stole the British crown jewels?

You might think nobody would have the skill or the courage to steal something as precious and easily recognisable as the crown jewels. But on 9 May, 1671, a daring Irishman, Colonel Thomas Blood, made a near successful attempt to steal them. Although he and his accomplices were caught and imprisoned in the Tower of London, they were not executed, as everyone had expected. Instead, the king, Charles

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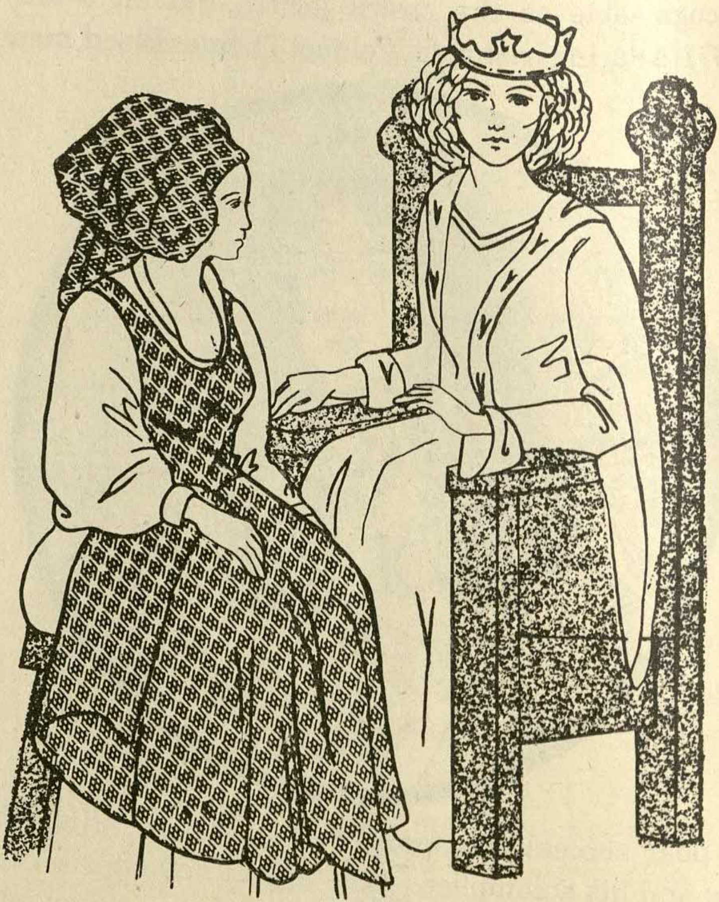
II, was so impressed by the audacity of the robbers that he pardoned them, and even gave Colonel Blood a place at court and lands in Ireland!

Where does the term "in the chair" come from?

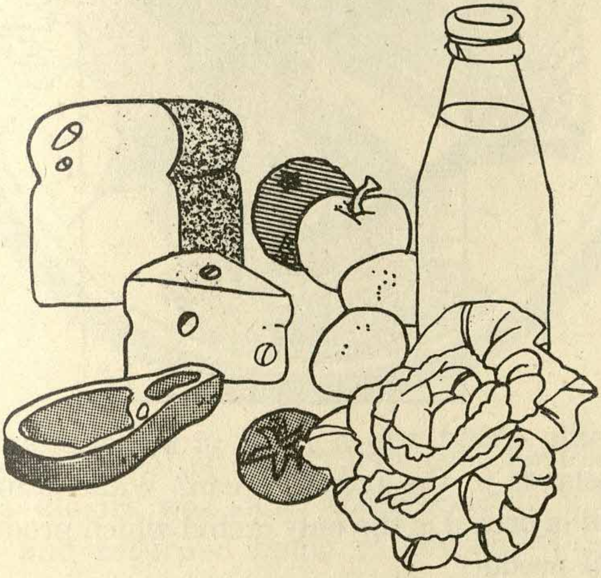
Long ago, only the very wealthiest people could afford a proper chair to sit in. Poorer folk used rough benches, stools or the floor. At meals, therefore,



the lord or lady of the manor used the chair, while the less important people used the benches. At meetings today, the person who is in charge of keeping order is said to be *in the chair* or *chairing* the meeting.

Why do we need vitamins?

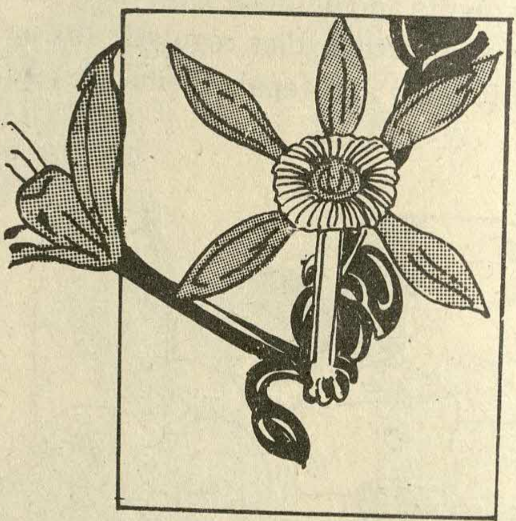
First of all, what are vitamins? They are substances which are necessary to life, and they are produced by various plants and animals. Everybody must have these vitamins in their diet regularly to enable the body cells to grow and repair themselves. Although scientists have long and complicated names for vitamins, we know them best by their simple letters, A, B, C, D, E, and so on, and each one performs a vital job. Vitamin A, for example, helps prevent infection; and Vitamin C prevents scurvy, a disease



which makes the body's bones weak and the teeth loose. Vitamin D is especially important for growing children as it makes their bones strong. If we have a good balanced diet, the chances are that we are getting all the vitamins we need.

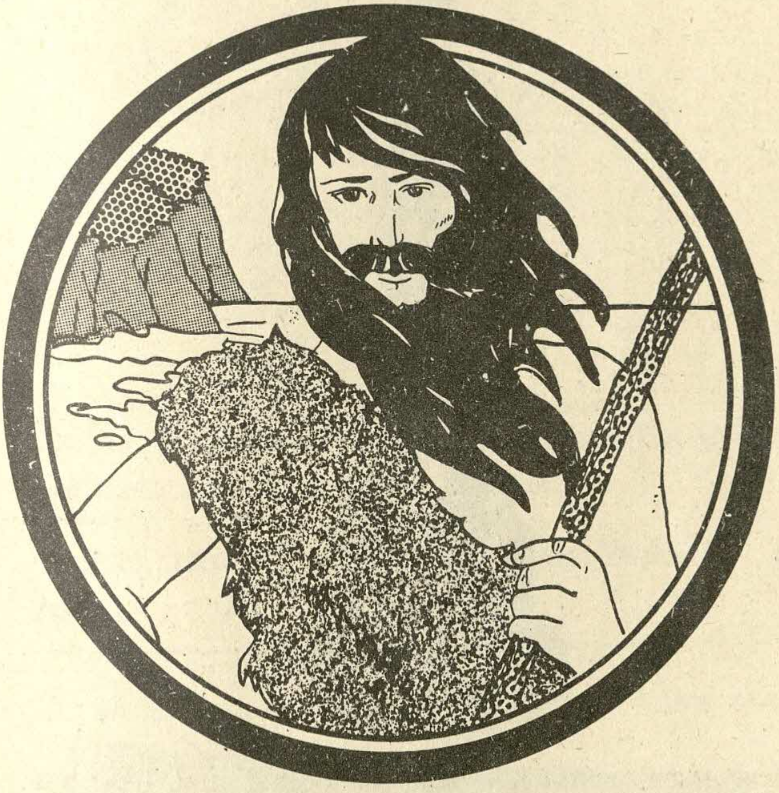
Where does vanilla come from?

Vanilla flavouring is something we are all familiar with. But did you know that we get vanilla from the vanilla orchid, which grows in Madagascar and other islands in the Indian Ocean? What is more, the vanilla orchid is the only orchid which produces a useful product.



Who was the real Robinson Crusoe?

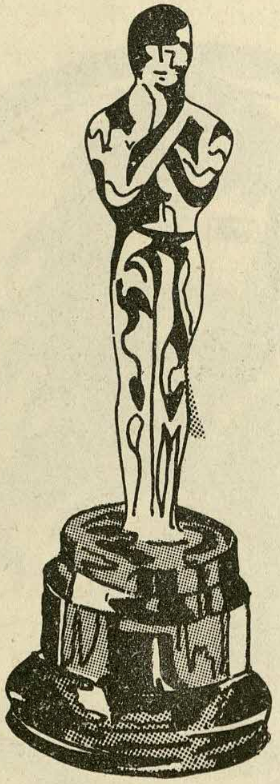
Daniel Defoe's fictional hero Robinson Crusoe is well known today. But not so well known is the real castaway, a Scotsman named Alexander Selkirk, who chose to be left on Juan Fernandez, an island named after Spaniard who had discovered it a hundred



years earlier. After living there alone for over four years, Slekirk was found and rescued by a British ship and returned home to Britain, where his adventures inspired Defoe to write *Robinson Crusoe.*

How did the Oscar get its name?

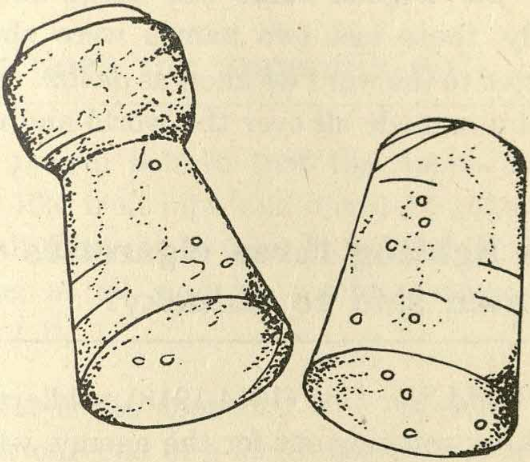
In 1929, the first awards for best performances in films were made. These awards were shaped like a man, and a secretary at the Academy of Motion Pictures Arts and Sciences, on seeing one for the



first time, remarked that it looked just like her uncle Oscar. The name stuck, and the awards have been called Oscars ever since.

Where does cork come from?

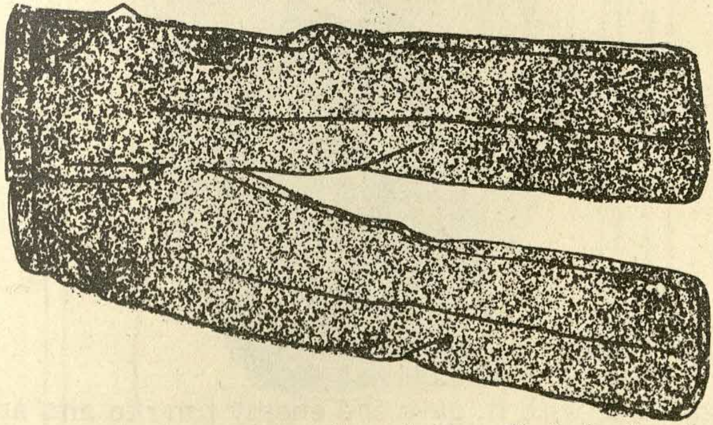
Cork is the thick and spongy bark of the cork oak tree. These trees don't grow to be very tall but they have quite thick trunks. Taking the cork bark off the tree can only be done every ten years, but about forty-five pounds, or about twenty-two kilograms of cork can be stripped off one tree at



a time, so that every ten years a plantation of cork oaks can give a very high harvest.

Where do we get the word *denim* from?

If you have a pair of jeans, you will know that



what they are made of is a cloth called denim; but do you know where the word comes from? At first, it was used to describe a serge cloth made in Nimes, France - the original name was '*serge de Nimes*'. Gradually, these last two names were shortened and adapted to the word we know as *denim*, although now denim is made all over the world and not just in Nimes.

Why is lighting three cigarettes with one match said to unlucky?

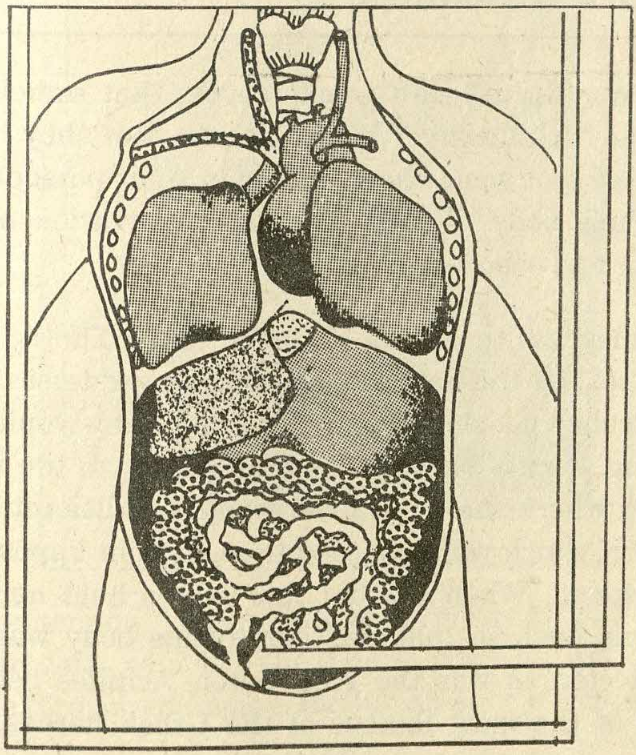
During World War One (1914-1918), soldiers fought in trenches, watching out for the enemy, who were never very far away, in *their* trenches. It was believed that striking a match at night and lighting three

cigarettes with it, gave the enemy time to aim and fire at the match's light, and thus the soldiers themselves. So, lighting a third cigarette with the same match was not only unlucky, it was dangerous too.

What does the appendix do?

Some people believe that the appendix 'catches' things like fruit pips, and has to be removed when it is full. This is not true. In fact the appendix does nothing at all, and we would manage very well without it.

So, what is the appendix? The appendix is a small tube at one end of a large intestine. It is closed at

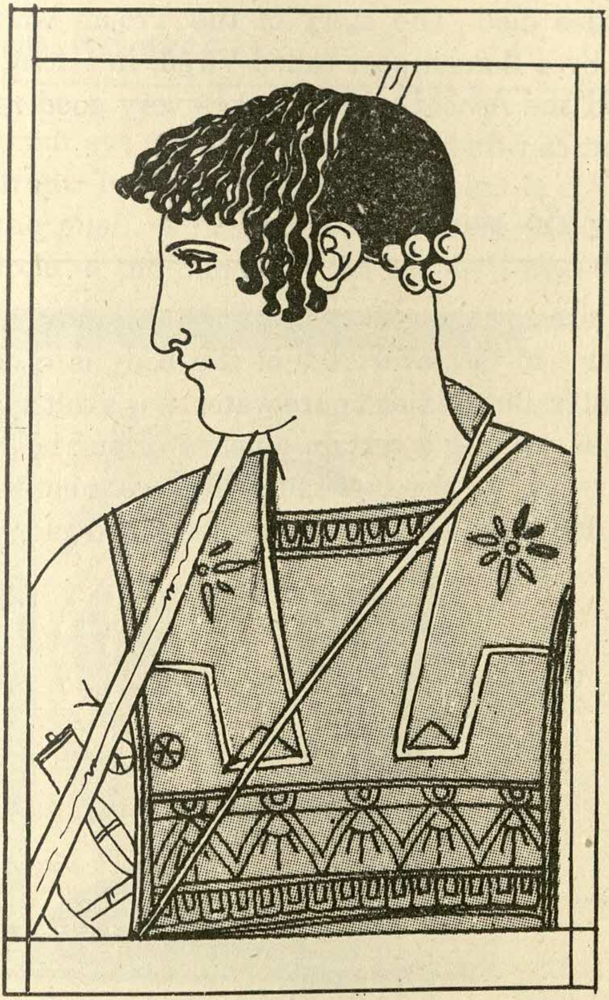


one end, like a sort of pocket. The appendix has to be removed when it becomes seriously inflamed by an infection, which is quite common. Substances from the intestine enter the appendix and cannot easily get out again. If they stay there, these substances may harden, forming a plug, which squeezes the appendix's blood vessels. This can cut off the blood supply to the appendix, and an infection may easily arise. Pain starts in the stomach, and then is concentrated on the right side of the body. Then it is a case of calling for the doctor and having the appendix removed by a simple and quick operation.

Who was Achilles?

You may have heard people saying that somebody has an 'Achilles heel', which means that they have a weak spot somewhere, either in their personality or their body. Where does that expression come from, and who was Achilles?

Achilles was the son of a woman called Thetis, who was told by the Fates, ancient Greek goddesses who controlled people's destiny, that her baby would die young. Thetis took the child and went to the river Styx, where she dipped the young Achilles into the water, which was supposed to make him impossible to wound. When she did this Thetis held her son by his heel, so that this part of his body was not protected as was the rest. Later, Achilles became one of the most famous of the Greek heroes, and was a warrior in the Trojan wars. During these wars, Achilles captured a girl named Briseis, who was taken away from him by the Greek leader Agamemnon. Achilles refused to fight any more for

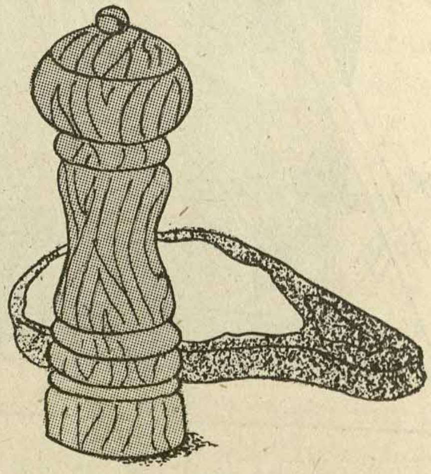


Agamemnon, but he lent his armour to his friend Patroclus, who led the Greek army in his place. The Trojan champion Hector killed Patroclus, and

Achilles decided to seek revenge. He killed Hector and dragged his body round the tomb of Patroclus. Achilles was killed when Hector's brother Paris shot a poisoned arrow at him. It struck his heel, the part not protected by the water of the Styx, and Achilles died. The story of the Trojan wars was told by a Roman poet called Virgil, in a long poem called the *Aeneid,* and it makes very good reading if you can find a translation of it.

Why do we need salt?

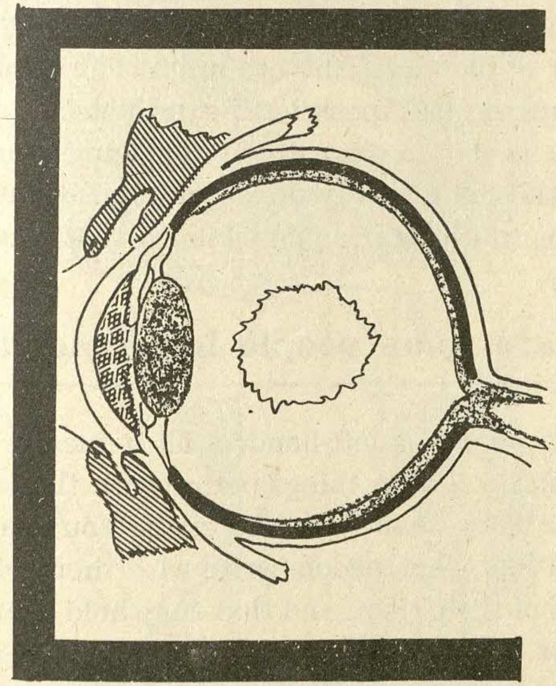
We already know that the body contains a lot of water - in fact over 70% of the body is composed of water. But this isn't pure water. It is a salt solution, and as we lose a certain amount of our body fluid every day, we also lose salt, which we must replace. We don't get salt from vegetables and plant food, but we do get it from meat. This is why purely meat-eating animals don't need extra salt, whereas



those who eat only vegetation, such as cows, do need extra salt. Because most people eat both vegetables and meat, we only add a very little amount of salt to our meals. If we had no salt at all in our diet, we would soon go mad for lack of it.

How do we see?

The human eye is shaped like a ball with a bulge in the front. In the middle of this bulge is a hole called the *pupil*, which is the part we see as the black circle in the middle of the coloured *iris*. The pupil lets in light to the eye. Behind it is the *lens*, which focuses the picture of what we can see. When light passes through the lens, it is turned upside

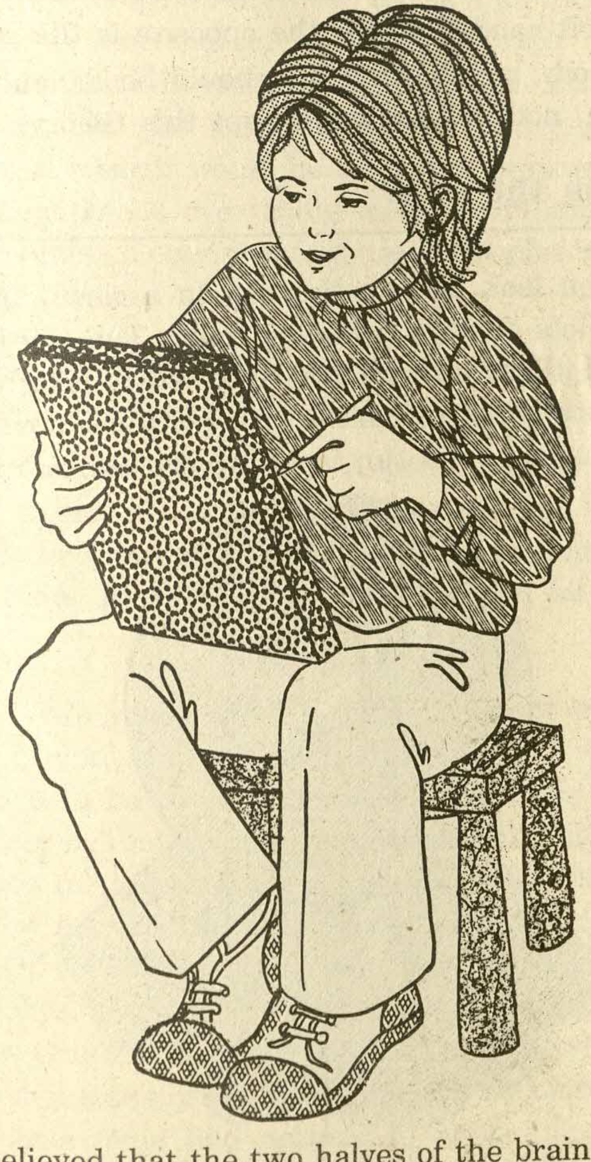


down, so that an upside down picture is the image which hits the *retina*.

The retina is the part of the eye which actually makes sense of what we see. It is sensitive to light, and can sort out all the different colours we see. When light hits the cells of the retina, a chemical change takes place in the cells. This starts messages or impulses in the *optic nerve* at the back of the eye, which takes these messages to the brain. The brain turns the images the right way up, and identifies them as something we can recognise. Have you ever wondered why the pupils of the eyes grow bigger and smaller? This happens according to the amount of light available. In bright light, the pupil closes up to a black speck, letting through only enough light to be able to see without damaging the retina. When the light is very dim, the pupil opens up to let in as much light as possible, so that, again, we can see.

Why are some people left-handed?

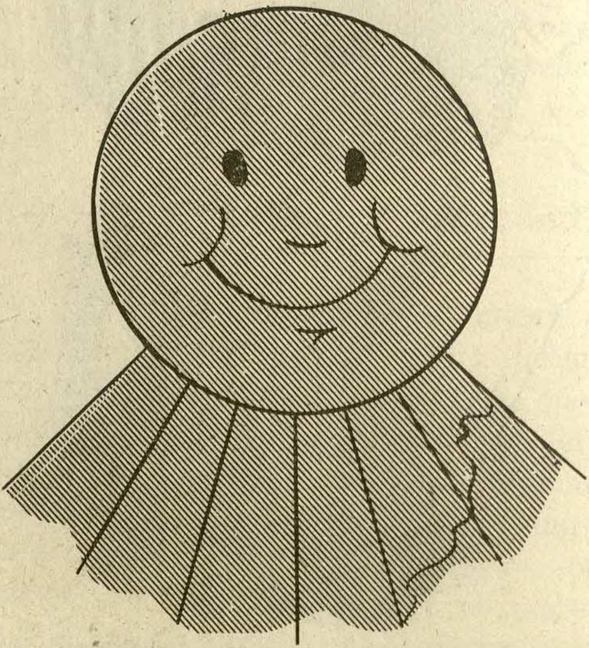
When a person is left-handed, all it means is that they can do certain things better with the left side of their body than with the right. You may have noticed that some people write with their left hand instead of their right, and that they hold their knife in their left hand, and other similar things. This is not 'wrong', and in fact attempts to force someone to become right-handed can often do more harm than good. But what causes left-handedness? Nobody can really say. It is not something with a single explanation. One theory is that the human body is not the same on both sides - that is, it is not symmetrical. One side dominates the other, and it



is believed that the two halves of the brain control this, the left side of the brain controlling the right side of the body, the right side of the brain controlling the left side of the body. In most people, the right side of the body (the left side of the brain) dominates, but in left-handed people the opposite is the case. But nobody knows why this should be so, and in any case, not all scientists accept this theory.

What is the sun?

When you look up into the sky on a clear night, you see lots of stars twinkling there. The sun is a star, and it shines by its own light, which is formed by bursts of energy from the inside of the sun rising to the surface. The sun is extremely hot - so hot



that it would turn anything which got too close to it into gas, even something as solid as a piece of steel. We don't know very much about the sun, because of course we can't get close enough to it to do tests, as we have on the moon. But what we do know is that the sun is a very average sized star, and that it is not abnormally hot when compared to others. We also know that if the sun stopped shining, the earth would be destroyed because the sun's heat keeps everything alive. Fortunately it contains enough energy to carry on shining for billion of years to come.

Are there such things as fairies?

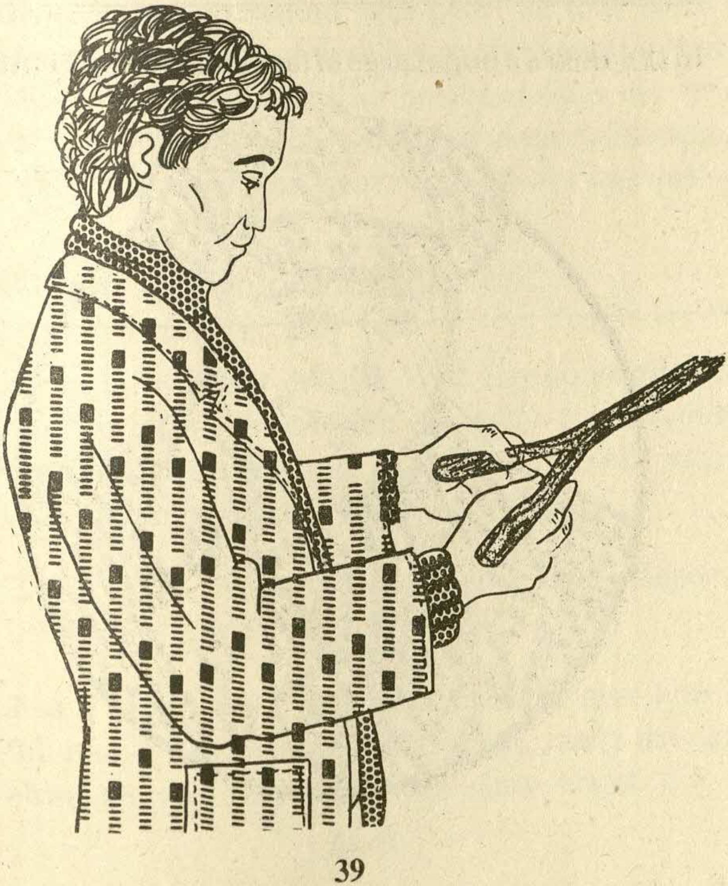
Do you believe in fairies? You have probably read lots of stories about them, but possibly you don't believe that they exist. Well, if you are doubtful about them, here's a story that may well interest you.

In 1917 two young girls in Yorkshire borrowed a simple camera and took some photographs - which still have to be explained. They showed the girls in a copse behind their houses, apparently playing with and talking to fairies, little people about the size of a hand, with wings and traditional elvish faces. Of course, everyone said that the pictures were fakes, and that the girls, Elsie Wright and Frances Griffiths, had somehow tricked everybody. But when it actually came to examining the pictures, the experts could find nothing to prove that the girls had tampered with anything on the camera or the film. It seemed that they really had taken pictures of fairies. Not content, the experts went to Yorkshire and gave Elsie and Frances a camera with specially marked film, and asked them to take some more photographs of the fairies. The girls did so, and the result was more pictures of the fairies.

And still nobody could say that the photographs were anything but genuine. People have tried ever since to find something in the photographs which would prove that they were faked, but nobody has been able to do so, and the Yorkshire fairies have remained a mystery ever since.

What is a Dowser?

A dowser is another name for a water-diviner someone who can tell where there is water lying underground. The dowser uses a whole variety of tools to find the water, but one of the most common is the Y-shaped twig from a hazel tree. The dowser holds the twig by the two prongs of the Y, with the long stem pointing upwards. When the twig is



above a spot where there is water beneath the surface of the earth, the stem of the twig will suddenly dip downwards, or in some cases it will twist itself violently out of the hands of the dowser.

Nobody knows exactly how this is done, not even the dowsers themselves, but it may be that they have some special powers which the rest of us don't possess - it is certainly true that only a very few people can do this.

Who are the Pearly Kings and Queens?

In the 1880's a huge cargo of fashionable pearl buttons

arrived in London from Japan. One of the street vendors in the markets of the time liked the look of them, and he decided to sew a few of these buttons around the hems of his trousers. The fashion soon caught on among the street vendors, with people trying to outdo one another in the number of buttons they had on their clothes and the various patterns they were in. The Pearly Kings and Queens were elected by the rest of the street vendors, or *costers* as they were known, to lead them against bullies who were trying to drive them out of their *patch.*

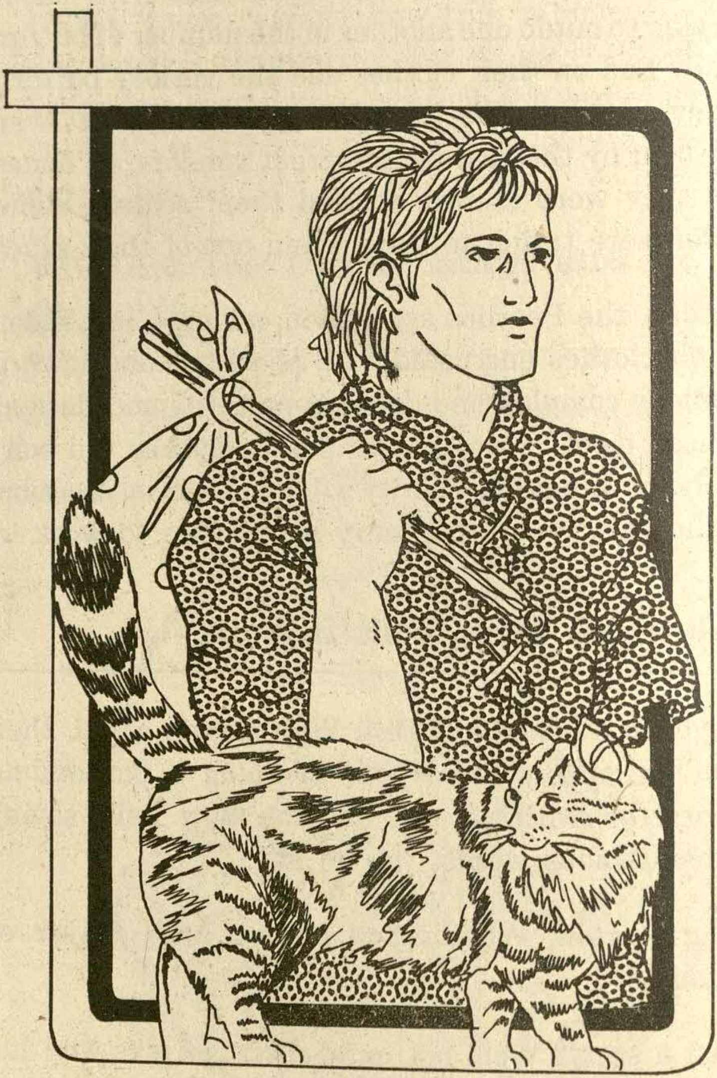
Today, the Pearlies are still in evidence in London, their clothes encrusted with pearl buttons sewn in various complex and detailed patterns and designs. These days, however, the pearly clothes are worn only for things like charity work and special occasions they are much too heavy and ornate to work in!

Who was Dick Whittington?

If you have heard of Dick Whittington at all, then you'll probably know him as being a pantomime character, with his cat, and the Bow Bells saying those famous words:

"Turn again, Whittington, thrice Lord Mayor of London!"

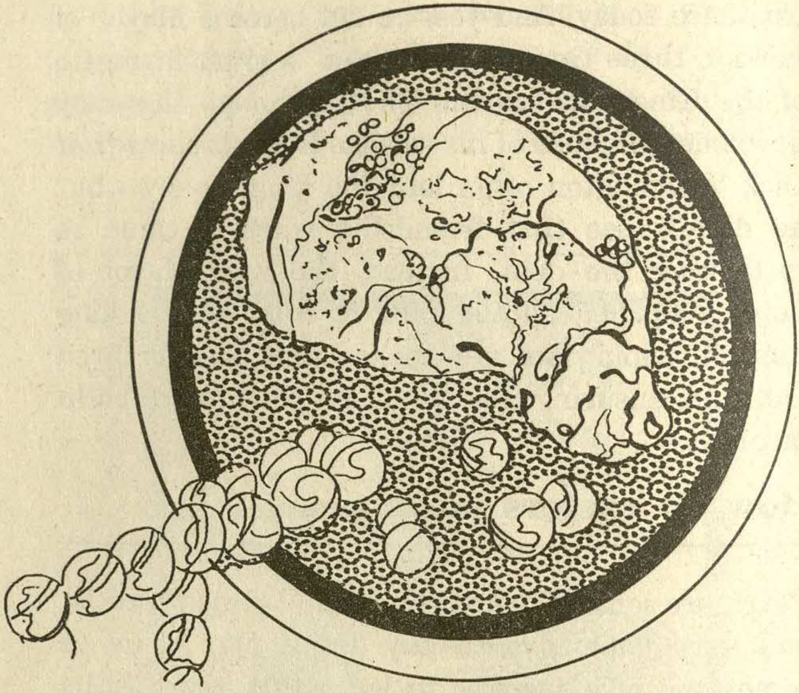
Just a story? Well, not quite. Dick, or give him his full name, Sir Richard Whittington, really did exist, although you can forget the story about the cat and Bow Bells. Dick was the son of a wealthy Gloucestershire landowner in the fourteenth century. He decided to try life in London, and soon became very successful and very rich. He built



almshouses and libraries in the city, and restored Saint Bartholomew's Hospital, which is still in existence today. And yes, he did become Mayor of London three times. He was also a great favourite of the King, Edward the Third - though this may have been because of his wealth! Records show that Dick Whittington often lent the king money - but he didn't lose that friendship when it came to reclaiming the debt. Instead, the wise Mayor of London burned all the bills in front of the king himself, wiping out any money that he was owed and thus ensuring that he would continue to be in favour.

How do oysters make pearls?

Pearls are some of the most beautiful gems we know, and very expensive to buy. So it may come as something of a surprise to learn that pearls start off as irritating grains of sand and other substances which get into the soft part of the oyster. The oyster is a mollusc, which means that it has a soft and very sensitive body inside its hinged shell. When a grain of sand or grit gets inside the shell and on to the soft body of the oyster, the creature covers it with layer upon layer of a hard smooth substances called nacre, which is the same substance which makes mother-of-pearl. It does this to cut down the irritation caused by the sand, and it adds more and more nacre, forming the pearl. It is easy to see how people hit on the idea of deliberately putting a grain of sand or a small bead inside the oyster and allowing the animals to cover it with nacre, so that oyster forms what is called a cultured pearl;



although these are real pearls, they are started deliberately.

What are nerves?

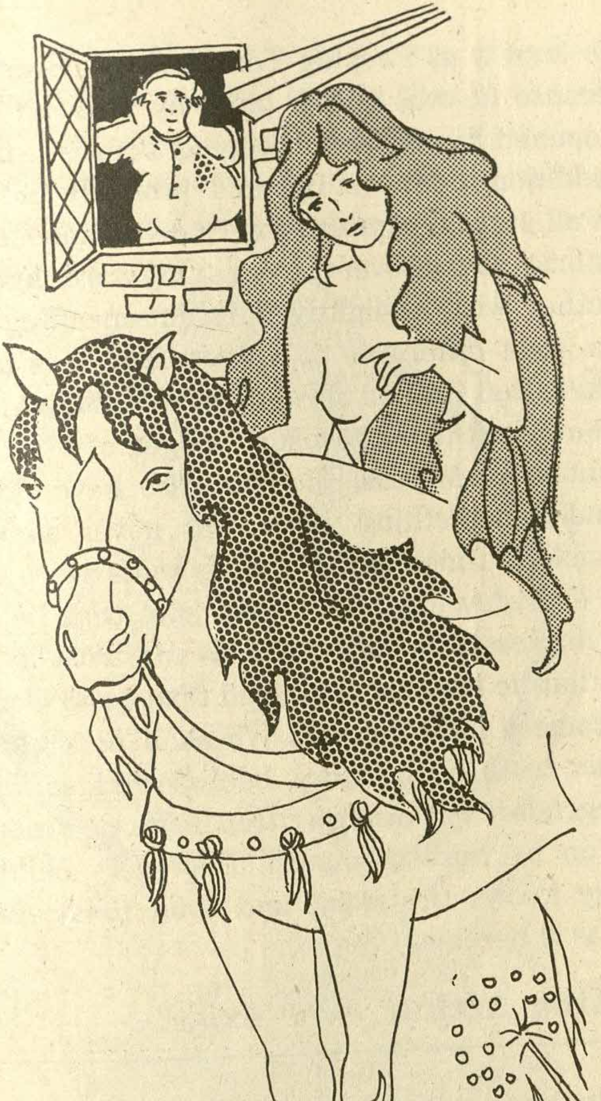
Nerves are the organs which tell us what is going on in the world outside our bodies, and which take messages about this world to the brain, which translates the messages into feelings. There are four types of nerve in the body. The first is the one which picks up messages like pain, light, cold and heat. The second type of nerve receives these messages and sends others to parts of the body which cause swift action to be taken. For example, if you touch a hot iron, the first type of nerve tells you it is hot, and a split second late the second sort of nerve makes your muscles pull your hand away in what is called a reflex action. The third type of nerve takes messages over longer distances in the body, and is the type of nerve which makes our body do the things our brain orders it to do, such as moving parts of the body to perform certain actions. The final sort of nerve is that which transmits messages from the first type, called sensory nerves, to the brain where the messages are translated into feeling. This is why, having touched the iron, we

may not feel the pain until just after we have pulled our hand away. We have nerves all over our body, although there are more in certain parts than in others. The central nervous system, through which all messages pass, is composed of the brain and the spinal cord, which is why we have to take special care not to damage our head or backs.

Who was Lady Godiva?

Long ago, in Anglo-Saxon times, the people of the town of Coventry, in England, were saved from paying very heavy taxes by the action of their countess Godiva, who rode naked round the town to prove to her husband, Earl Leofric, that she was ready to do almost anything to make her people's life easier. This is legend, and in Coventry itself there are monuments to Lady Godiva, streets named after her, and even a clock which, every hour, re-enacts her ride. But who was the real Lady Godiva?

Godiva, or as she was probably called by her subjects, Godgifu, was a very wealthy landowner, and her prize possession was Coventry. She was married to Leofric, who was the Earl of Mercia, a big area covering all of the midlands and most of what is now the north of England. Both were Christians, and the ruins of a church they built in Coventry can still be seen. Legends has it that on her famous ride, Godiva asked the townspeople to go indoors and shut their doors and windows so that she would not be seen. She was disobeyed by a man who has



become known as Peeping Tom, but he never saw her because he was struck blind by a divine light as he opened his window. Peeping Tom is a much later addition to the story, and probably did not exist at all. As to the question of Godiva's nakedness, many stories change over the year. One word changed for another with a slightly different meaning can make a great difference to a story, and it is more than likely that instead of riding naked, Godiva rode in Coventry without the usual badges of her rank as Countess of Mercia. She may also have ridden unattended, something which was never done in those violent times when Viking raids were still part of everyday life. The legend says that Leofric was so impressed by her goodness and trust in her people that he lowered the hated taxes, and Godiva has become a local heroine. We shall never know the exact truth of the story, because like so many other legends it was never written down, and merely passed on by word of mouth. But every child in Coventry knows the story, and even today, Lady Godiva is a heroine.

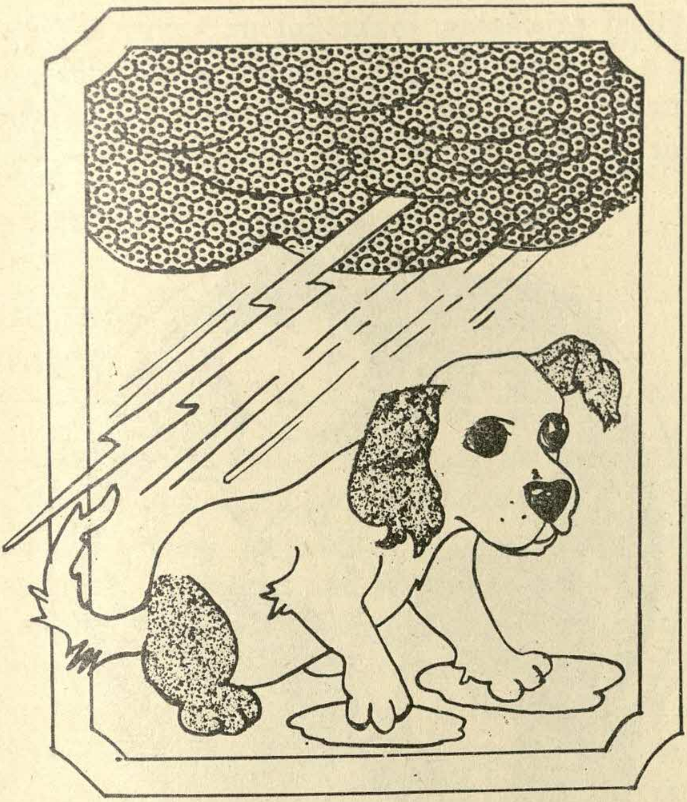
Did King Arthur ever exist?

Everyone has heard of King Arthur and his knights of the Round Table, of Lancelot and Guinevere, and the quest for the Holy Grail. Many stories have been told about the court of Camelot ever since the Middle Ages, when such romantic tales were popular. But stories is all these legends are - it is very doubtful whether Arthur, the romantic hero of legend, ever did the deeds he was supposed to have done. However, it is certain that in the sixth century there was a chieftain, perhaps of Romano-British descent, who may have led his people in battles to defend Britain against Saxon invaders.

This chieftain may have been Arthur, although he is only referred to in old writings as *Dux Bellorum,* a Latin title meaning war lord. Nobody knows where Arthur's capital city and palace of Camelot is, although many places all over Britain and in parts of France have claimed to be the site, and despite the lack of proof about Arthur's existence, stories about him and his knights are still very popular. A very well known tale is that the king did not actually die in his last battle of Camlann, but was carried away to Avalon (which might to be another name for Glastonbury in Somerset) to sleep beneath the hills until his country needs him again in a time of great crisis.

What are thunder and lightning?

Some people become very frightened during a thunder storm, but there's really nothing to worry about. Lightning is the result of a collision between two electrical charges - one positive, and the other negative - either in two clouds or in a cloud and the earth. When the difference between the two charges becomes great enough, a great spark - the lightning - jumps between the two. Thunder is caused when that electricity has been discharged. The air expands and contracts rapidly, and the air currents collide violently, causing the rumbling noise we know as thunder. You may have heard stories of people and things being struck by lightning. The spark of electricity hits the earth and is absorbed by it. Sometimes it does hit things like trees, but the likelihood of it hitting a person is very small indeed,



and there is no need to be frightened of a storm

What causes different skin colours?

If you walk down a street in any town or city, you will see lots of people with different coloured skin: white, black, yellow and coffee colours all appear. But why do people have different coloured skin?

The reason is that in your skin you have substances which, under certain conditions and with the correct chemical processes, make colour - the different shades of human skin. The amount of each different colour or *chromogen* in your skin determines what colour you are. One of these colour is formed by a

substance called *melanin*, which appears as black or dark brown when it comes into contact with sunlight, and which gives you a sun tan. Everyone has melanin in their skin, but people who live where the sun shines all year round have more melanin in their skins than people who live in colder areas. It protects them against the harmful rays of the sun. Other colours in the skin are yellow, which is caused by a similar process as black; red, which is caused by the presence of blood vessels in the skin, and white, which is the colour of skin without any colour in it. The balance of these four colours in your skin decides what colour you are.

Why was King Alfred called 'the Great'?

Well, he was not called 'the Great' because he was a tall man; he was not. Alfred became king of Wessex (a small British kingdom including what is now Hamphsire, Somerset and Wiltshire) in AD 871, at a time when the Vikings ruled over large parts of England. The king was determined to defeat the pagans, under their king, Guthrum, and he succeeded. By the time of his death in 899, almost all of England was under his rule, and the Viking armies were defeated in many battles. Alfred was a Christian, and when he was young he had been sent to Rome to be blessed by the Pope. But despite his faith Alfred, like most kings of his time, was proud of the fact that he was descended from pagan gods like Woden. There is one legend about Alfred which everyone knows - that while hiding in a woman's cottage in Athelney marshes, Somerset, at a time when the Vikings seemed to be winning, Alfred was supposed to be looking after some cakes, so that they did not burn. Thinking deeply about the state of his country, he forgot the cakes, and they burned. When she came back, the woman scolded him, Alfred apologised and paid for the cakes.

It is very doubtful whether this ever happened, but what it shows us is that people believed Alfred to be a kind and humble man, and we know that they willingly followed their brave and wise leader into battle against the invading Vikings.

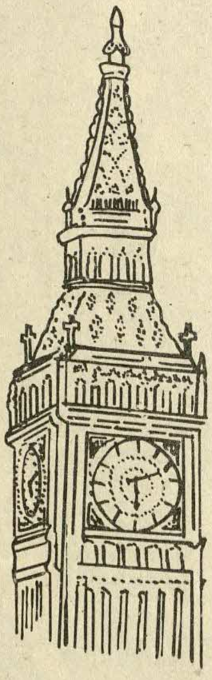
What was the Trojan Horse?

The story of the Trojan Wars was told in a poem by the Greek poet Homer, the *Iliad*. The Greeks and Trojans were at war for some years. In about 1200 BC the Greeks stopped besieging the city of Troy and apparently disappeared, leaving behind them a huge wooden horse. At night, while the Trojans slept, Greek soldiers who had been hiding

inside the horse, slipped out from inside it, killed the Trojan sentries and let the waiting Greek soldiers inside the city. Soon Troy was destroyed. Although the city of Troy did exist, and the war did take place, the legend of the Trojan Horse may be just that - a legend.

What is Big Ben?

If you thought that the clock in the tower of the Houses of Parliament in London was called Big Ben, you would be wrong. The tower itself is called St. Stephen's Tower, while the clock is called the Westminster clock, and it is the bell that strikes the hour which is called Big Ben. This bell weighs thirteen tons. so it is no wonder that it is called *Big Ben* !



Why do we have hiccups?

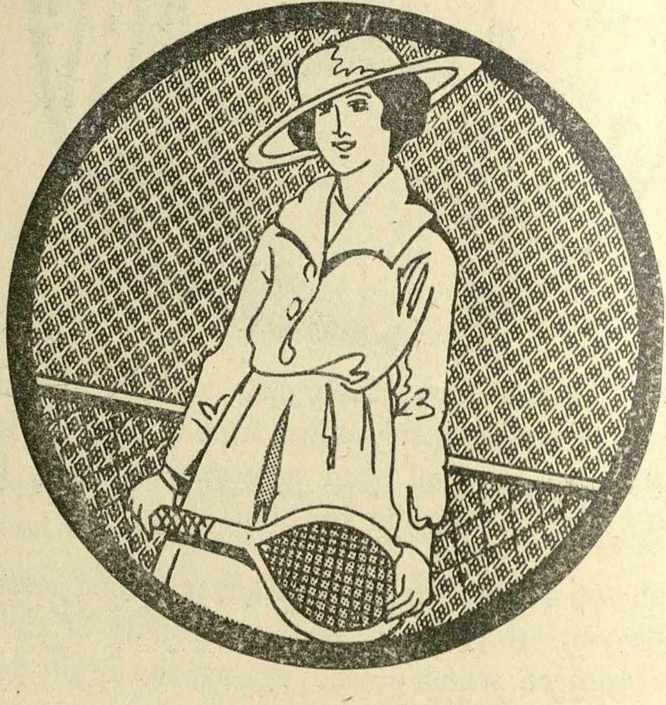
You've probably heard of lots of cures for hiccups, some of which may work once or twice, and some of which may not work at all. For example, giving someone with hiccups a sudden shock, putting

something cold down their back, or even drinking a glass of water upside down from the wrong side of the glass have all been suggested as cures. But what causes hiccups in the first place?

When you eat very hot food, it may irritate a passage inside you, or you may have a build-up of gas in your stomach, which presses against the *diaphragm*. The diaphragam is an organ which separates your chest from your stomach. It tightens up and pulls air into the lungs. But because it has tightened up, the air can't get through all the way to the lungs, and it is stopped short by the diaphragm. We feel a dump when this happens, and describe the dumping feeling as hiccuping. So hiccups are a way of telling us that body is trying to get rid of the hot food or gas in the stomach.

Why is the word *love* used in tennis?

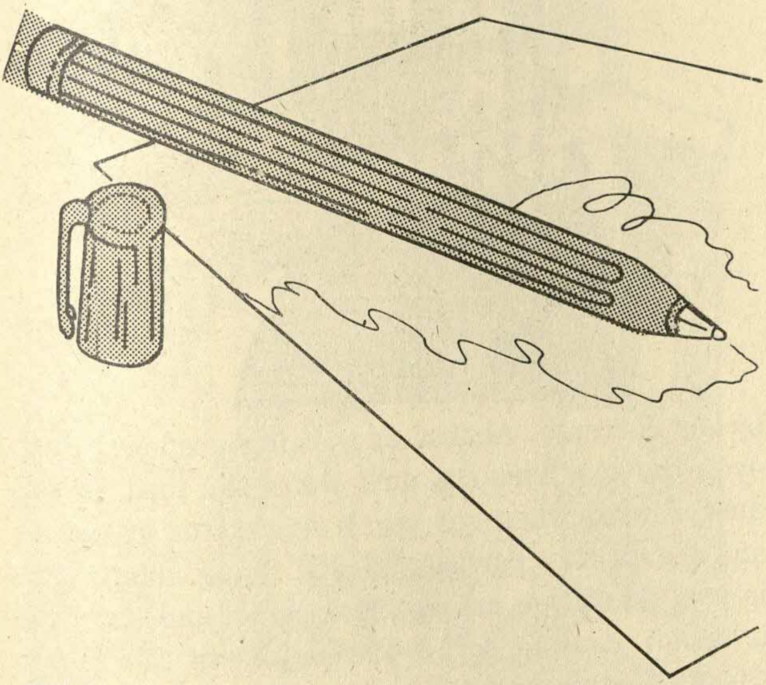
Long ago, no score was indicated on French tennis scorecards by an egg-shaped zero. This was known



as *"l'oeuf"*, the French word for egg, and the English-speaking players used the same word, but in this case it sounded like *love*, and has been called love ever since.

How does a ballpoint pen work?

The tip of a ballpoint pen, the part that writes, is very tiny metal ball in a socket. As you write, the ball spins, so that the ink is put evenly on to the paper. The side of the ball which you can't see is in contact with the cylinder which holds the ink, so that ink always moves evenly over the ball and makes the pen write smoothly.



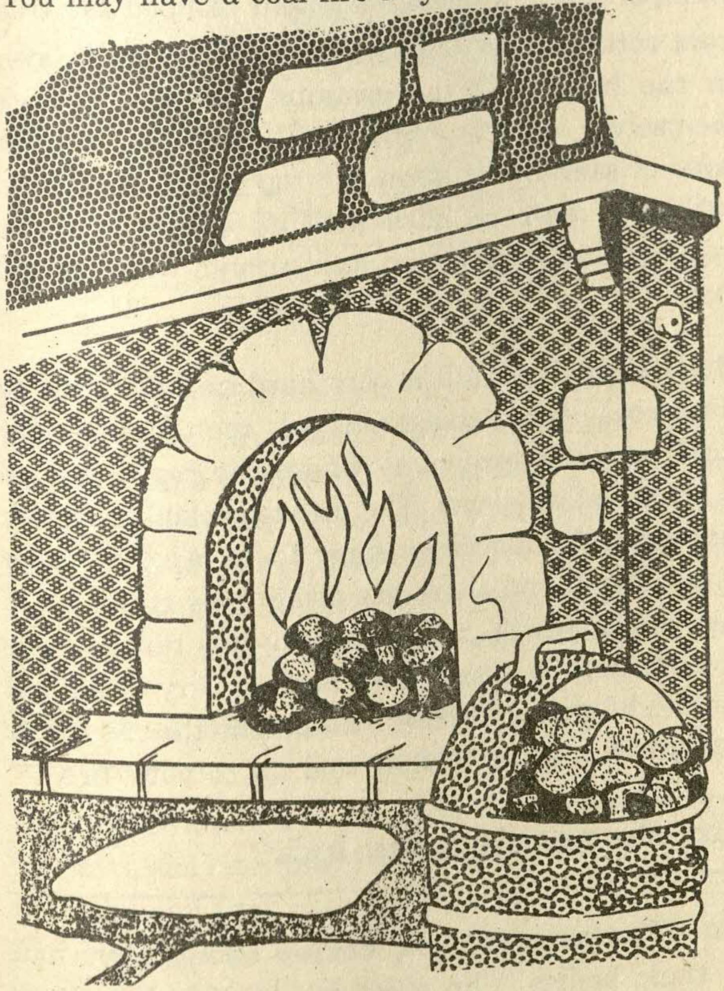
What is dust?

The most common sort of dust is the sort you wipe off tables and shelves, but this isn't the only sort by any means. Dust is tiny particles of solid matter, which are so light that they can be blown about

by air currents. Almost everything produces dust, even the sea. This sea dust takes the form of salt dust, caused when sea spray evaporates in the air and leaves tiny particles of salt flying about. This is why when you are at the seaside, and the wind is rough, causing spray, you can taste the salt in the air. You've probably heard of dust storms, which happen in dry areas where the lack of water means that plants and grasses don't grow. The dust on the ground is blown about by the wind, and can be carried for miles, in fact, dust from the Sahara Desert has been known to fall on London. Did you know that you can actually see dust as it flies about? You see tiny particles of something moving about in a beam of sunlight - these are what is called dust 'motes', and by trying to count them you can see what a lot of dust there is in the air.

What is coal?

You may have a coal fire in you house, or you may



know someone who has, and you probably don't think twice about putting lumps of black coal on to the fire to keep you warm. But did you know that coal is made of fossilised plants?

About three hundred million years ago, the land was very swampy and covered with thick forests. As the trees died, they fell into the water of the swamps, which was very acid and stopped the tree from rotting. The dead trees formed a thick layer on the bottom of the swamps, and the swamps themselves were later flooded by the sea. A thick layer of sand built up on the top of the wood, and pushed it down so hard with its weight that the wood gradually hardened and became what we call coal.

These days, it is still a very hard and dirty job to mine coal, and a dangerous job too. Tunnels are dug deep underground to where the coal is buried in layers called seams. The coal is packed so tightly that powerful machines have to be used in order to get it out, and there are sometimes accidents in coal mines which happen when the tunnel roofs cave in. Luckily these don't happen very often, but you might give the miners a thought the next time you throw a lump of that coal on to your fire.

Why do people have hair?

Like all other mammals, human beings have hair on their bodies. The chief job of this hair is to retain the body's heat, so that we do not die of cold. A man grows hair on his face and not so much on the top of his head, while a woman has more hair on her head and far less on her face. Men also

grow hair on their chests, which women do not, and the hair on a man's arms and legs is much thicker than a woman's. Humans also have fine hair in their ears and noses, and your eyebrows and lashes are, of course, body hair. It is believed that these hairs protect the delicate organs against dust and insects, which could otherwise damage them.

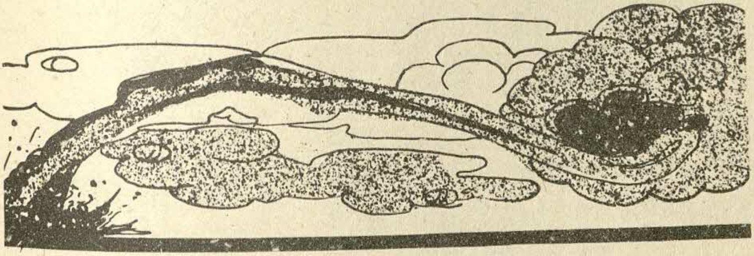
Who was Mrs Pankhurst?

Emmeline Goulden was born in 1858 in Manchester, England, and later married Richard Pankhurst. With his help, and that of her two daughters, Sylvia and Christabel, she formed the Women's Franchise

League in 1889, an organisation which campaigned for the right of women to vote. In 1903 she formed the National Women's Social and Political Union, with slogan "Votes for Women". Mrs. Pankhurst and her daughters, and their followers, were called the Suffragettes because they were fighting for women's suffrage, the right to vote at elections. They were often roughly treated by the police, who arrested them when they used more violent methods of drawing attention to their struggle. Many of them were imprisoned, and treated very badly. Finally, however, women over the age of thirty were given the vote in 1918, and ten years later, the year of Mrs Pankhurst's death, all women over twenty-one years old had the right to vote, putting them on an equal footing with men. It seems odd to think that women were only given the vote so recently, doesn't it?

What is a tornado?

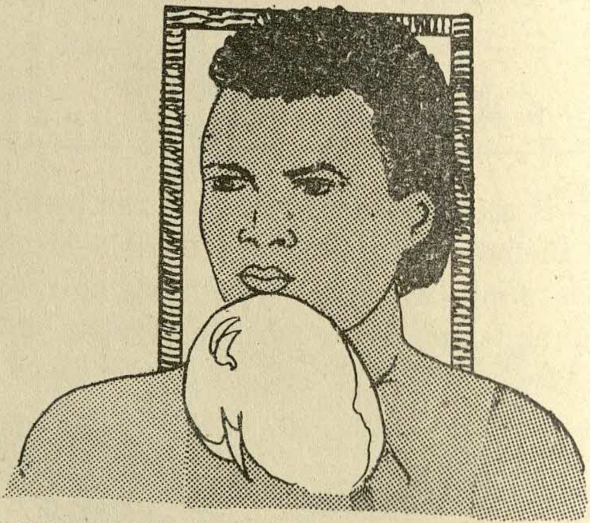
A tornado is really a small cyclone. It can be up to a mile in diameter, and can cause terrible damage. Tornadoes occur when the conditions to create ordinary thunderstorms are extremely violent, which happens very rarely and only in certain parts of the world. There is an updraft of air, around which winds blow in opposite directions. This starts a whirling effect, and a narrow spout is formed. Air is thrown away from the spout, leaving an area of low pressure in the centre of the tornado, which act like a very powerful vacuum, sucking up almost everything in its path. The winds around the tornado



are also very destructive - they can reach speeds of up to three hundred miles an hour.

What is the most common surname in the world?

In English-speaking countries, the most common surname is what you expect: Smith. But the most common surname in the world is Chang, with a total of more than 80 million! And the most common first name in the world? Mohammed!



What are mermaids?

Almost every sailor has a tale to tell about strange beasts he has seen in the waters of the sea, and some have told of mermaids, creatures which are half human and half fish. Fairy stories have grown

out of these tales, including the most famous of all, *The Little Mermaid* by Hans Christian Andersen.

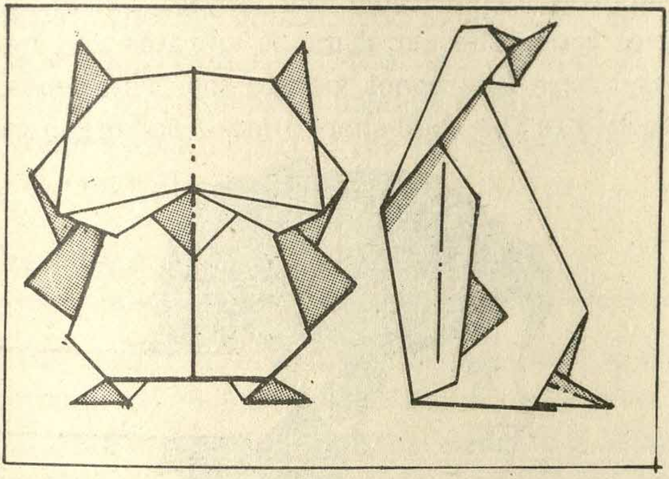
But are there really such things as mermaids? Obviously, the sailors saw something which began these stories, but was it really just as they said? Mermaids are supposed to be very beautiful sea creatures. They sit on rocks or float on the surface of the water, singing lovely and haunting songs while they comb their long hair. They have a sinister side to them as well; they are supposed to lure men down to live with them at the bottom of the sea. Of course, these poor men drown.

Nobody has ever caught a mermaid, although rewards have been offered for the first live mermaid to be caught. But the real mermaid may have been something not nearly as beautiful or as mysterious as the stories tell us.

In tropical waters there are strange creatures called manatees or dugongs, animals which look live very fat seals. They suckle their young on the surface of the water, and sightings of them from a distance may have been the origins of the stories about mermaids. They are not beautiful animals, but to sailors who had seen nothing but the sea, perhaps for months at a time, they appeared as something rather different from what they actually were. And the mermaid's songs? Well, have you ever heard recordings of whales 'singing' in the sea, calling to one another? It's a very strange and haunting sound, and may be the original mermaids' music. We cannot know for sure, but it seems a very likely explanation.

Where did origami come from?

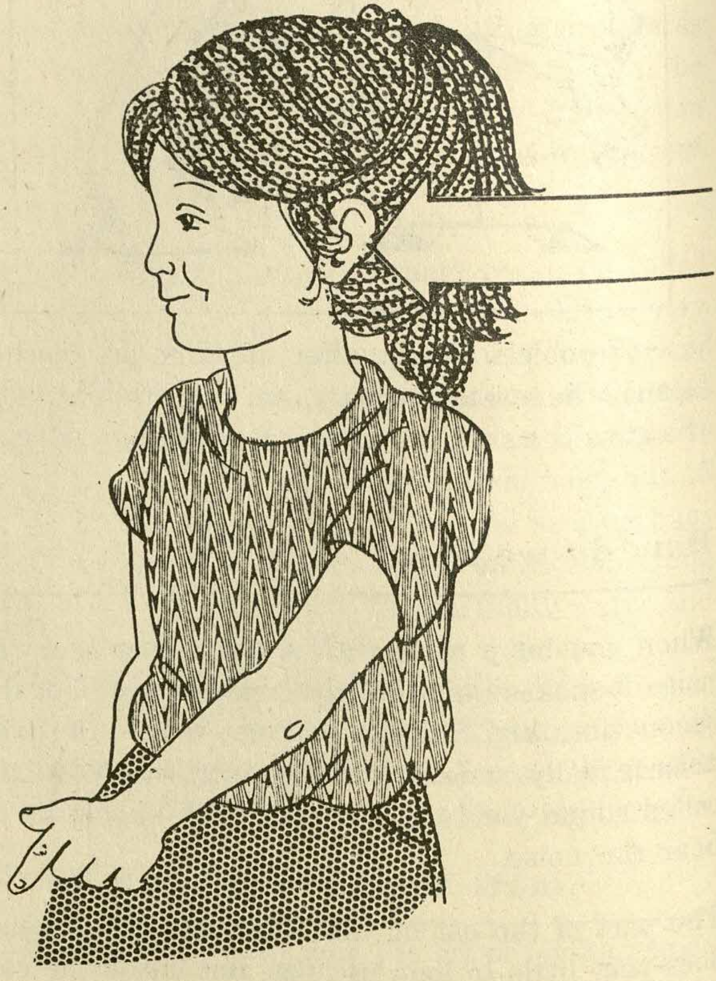
Today we think of origami, the art of folding paper, as a Japanese craft. But the skill originally came from China, where it was the custom to make household items from paper so that they could be burnt at a person's funeral and that person could have the objects in the after life. The art reached Japan in the seventh century, and it was the Japanese who gave the skill the name origami, and perfected it.



How do we hear?

When you hit a table with a spoon, you hear the noise it makes quite clearly. And you also feel the spoon vibrating. But you may not realise that the noise is really made of those same sorts of vibrations, called sound waves in the air, which enable us to hear the noise.

The part of the ear on the outer side of the head does very little to help us hear. But inside the ear are the delicate organs which actually do the work. The first of these is a thin skin, stretched tightly across a tube. This skin is called the *ear drum*. Behind it are three delicate little bones called the *anvil*, the *hammer* and the *stirrup*. When sound waves touch the ear drum it vibrates and makes these three tiny bones vibrate too. The bones are attached to the shell-shaped inner ear organ called



the *cochlea*, and the bones' vibration set up others in the fluid in the cochlea. Tiny cells here turn the sound waves into messages which the ear's main nerve takes to the brain, where the sounds are identified and recognised. Also in the inner ear are three other organs called the *semi-circular canals*, which control our sense of balance. If anything should go wrong with this part of the ear, we become dizzy and cannot balance properly.

What is a Unicorn?

On the royal coat of arms of Britain there are two creatures, one on either side of the shield. One animal is, of course, the lion and the other is a strange, horse-like creature with a long elegant horn on its forehead. This is the unicorn. It is a creature of legend, and probably never existed; the tales of it brought back by ancient travellers were probably the result of sighting of rhinoceroses and a good deal of imagination. Nowadays, nobody believes in the unicorn except as a legendary animal, and an heraldic beast, but years ago people did believe in its existence. Queen Elizabeth the First was supposed to have possessed a unicorn's horn, which was worth an enormous sum of money, and the horn was supposed to have healing powers and could protect people against poison. There were special rules laid down about how to catch a unicorn. A young girl was the effective bait, and the unicorn would lay its head in her lap while the hunters crept up to do their work. The unicorn became part of the British coat of arms when Scotland and England were first united under King James the First. Before that, England's heraldic beasts were a lion and a dragon,

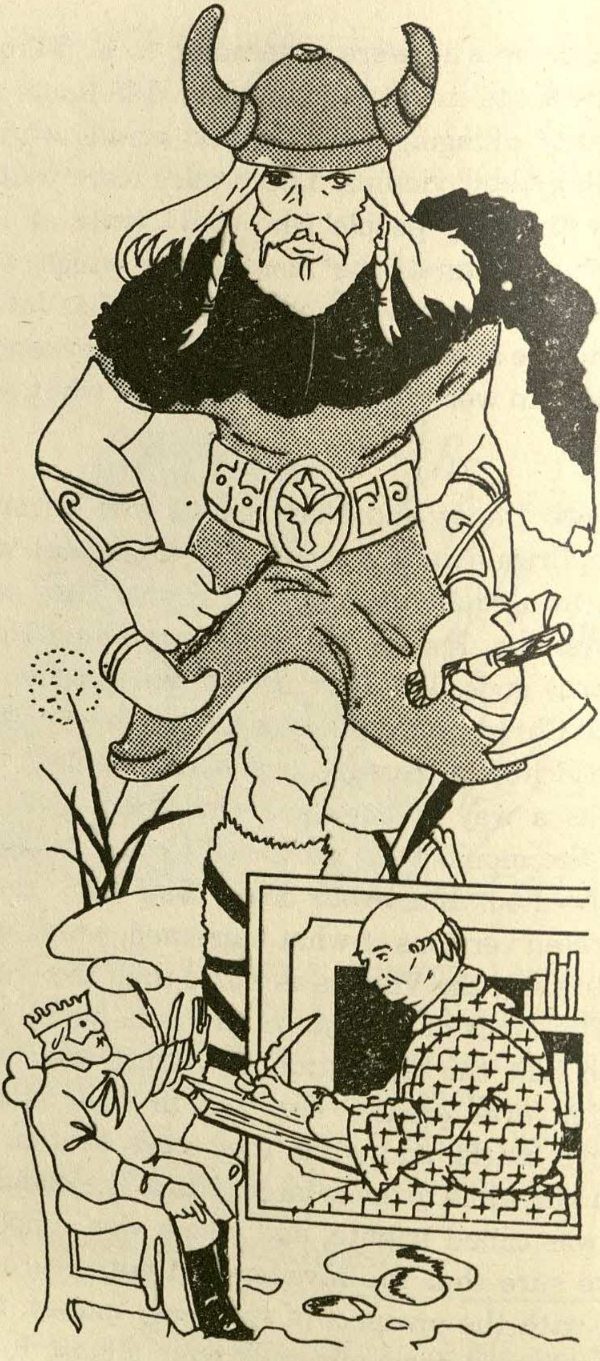
and Scotland's were two unicorns. Legend has it that the two beasts, the lion and the unicorn, were deadly enemies, and that the only way to stop them killing one another was to place them one on either side of the shield in the coat of arms, thus ensuring that they could never get at one another.

Who were the Vikings?

You have probably seen pictures or films of Vikings

- that is, actor who were pretending to be Vikings. These are huge men, wearing horned helmets and burning and pillaging churches and homes with no thought for their victims. These tales were written down by the only people who could write at that time - the monks of the monasteries which were robbed and burnt down, and so history has left us with a picture of savages almost unrivalled by anyone else. But who were the real Vikings, and what were they like?

They were Danes and Norwegians, who began to come to Britain in the year 789, when local wars in their own countries drove them out. They were not Christians. Instead they worshipped old Norse (Northern) gods like Thor, Freya and Balder, and regarded Christian churches as fair game when they saw the rich gold treasures inside and realised that here was a way of becoming rich themselves. Of course, the monks who had cared for the treasures were horrified, and wrote down their own, rather exaggerated versions of what happened, which were bound to show the Vikings as worse than they really were. The kings of England at the time did all they could to halt the rising tide of Vikings who were coming in ever greater numbers to their shores; they gave battle, and when they were beaten, the English kings had to make large gifts to the invaders, which was called tribute, and which was supposed to make sure that the invaders did not return. Of course, with the prospect of such easy money, they did return, and gradually took over almost half a



England, including Yorkshire, East Anglia and a large part of the midlands. The English have had Vikings kings - king Canute was a Viking, who became a very devout Christian, and was a strong king. Gradually the Vikings settled down in England and became English themselves, and we still use many words that they brought to our language. The last Viking invasion was in 1066, when the king of Norway, Harald Hardrada, attacked the north of England. The English king Harold defeated him at the battle of Stamford Bridge, and was then himself beaten and killed at battle of Hastings, only a few weeks later, by William the Conqueror, Duke of Normandy, who was himself descended from Vikings.

Who was Robin Hood?

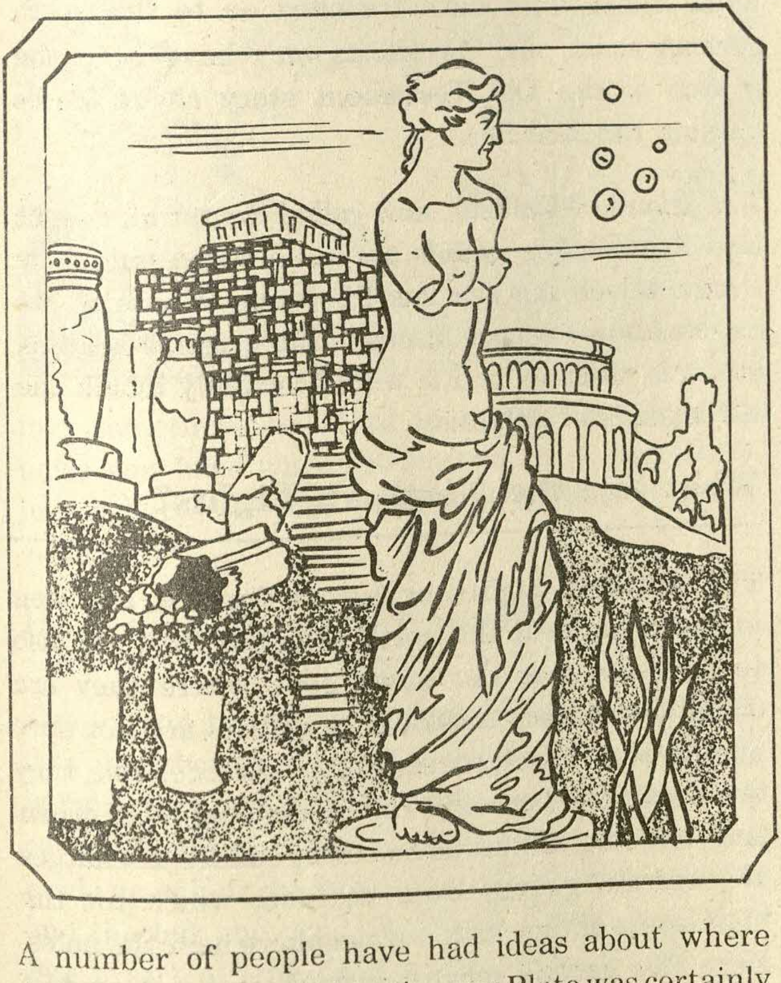
"He stole from the rich and gave to the poor" is a favourite saying about this notorious outlaw. According to legend, Robin is supposed to have lived in Sherwood Forest with his band of Merry Men, robbing wealthy travellers and giving their gold and jewels to the poor people of Nottinghamshire and Yorkshire. The first written account of him is the *The Vision of Piers Plowman*, a poem written by William Langland in 1377, and since then legends have grown up, showing Robin as a sort of medieval superhero, although obviously these legends were well known before the poem was written. In spite of these tales, not much is known of the real Robin Hood, and some people even believe that he may be sort of woodland spirit, since Robin was often

a name given to spirits, elves and pixies. It is doubtful whether anything will ever be known about the real outlaw Robin Hood, unless some startling evidence is found, proving him to have really been what all the stories say he was.

Where is the lost kingdom of Atlantis?

We know about the lost kingdom of Atlantis through the writings of the Greek philosopher Plato. He had heard the story from people to whom the story was already a legend, so it is by no means a new tale.

Atlantis was a very rich island with a huge city, a palace and a temple on the summit, and Plato tells us that its people became wicked and were punished by having their city destroyed in a day and a night when the whole island exploded and sank beneath the waves.

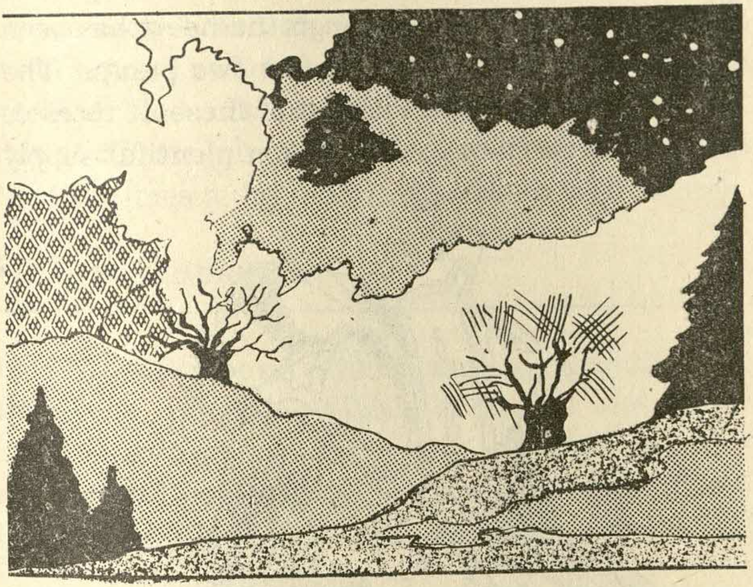


A number of people have had ideas about where Atlantis was, but one thing is sure; Plato was certainly wrong about where it was, and he may have mistaken the date of the disaster. The original Atlantis may have been off the coast of Greece, and called Kalliste. About 3500 years ago, there was a huge volcanic explosion on the island of Kalliste. The people tried to get away to Crete, an island about sixty miles away, but falling lava and rocks made escape impossible, and soon a huge tidal wave crashed down upon them. This wave travelled on to the north African coast, and its effects may have been the source of the Old Testament story about Moses parting the Red Sea.

The island of Kalliste, now called Santorini, is split into two smaller islands around a seven mile wide crater which the sea has filled up. Of course, we do not know for sure if this is the original Atlantis, but it is possible, and it would certainly match the old legends of Atlantis.

What are the Northern Lights?

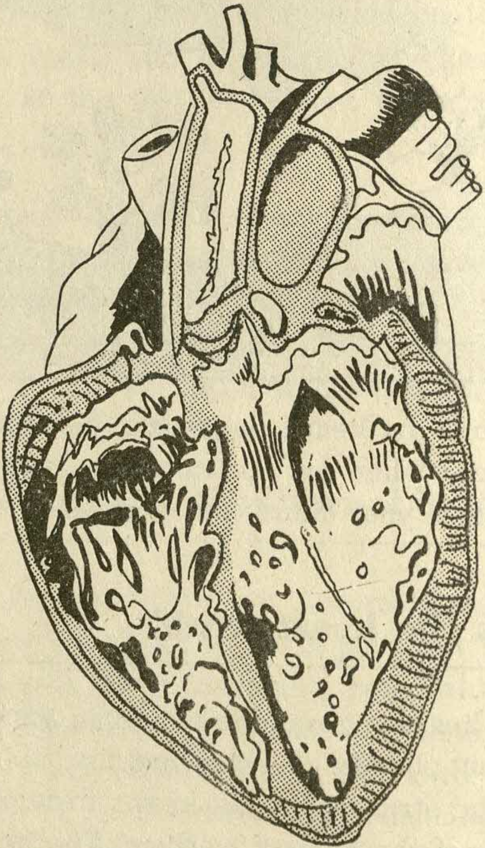
The Northern Lights, or Aurora Borealis, are seen in the areas near the north pole, but they are also to be seen near the south pole, where they are called the Aurora Australis. Scientists are not sure about what exactly causes the aurorae, but they think that the beautiful rays of dancing pink, green and yellow lights may be caused by sudden discharges of electrical energy from the sun, which hit the high layers of the earth's atmosphere near the poles. Here the earth's magnetic field does not protect the atmosphere from the sun's particles as it does over the rest of the planet, and so we see the lights in these regions. When they do appear, the sky



may sometimes be heard to crackle, just like the noise you hear when an electric spark sometimes jumps between your hand and a glass or metal surface.

How does the heart work?

The human heart is a remarkable organ. Although it is only about the size of a clenched fist, the heart is perhaps the strongest organ in the body, and is certainly one of the hardest workers. The heart is made up of four chambers, the left and right auricles and the left and right ventricles. There is a valve, like a sort of trap door, between the auricle ;and the ventricle on each side, which prevents the blood returning to the chamber it has just left. There are also valves between the auricles and the ventricles and the major blood vessels which are attached to the heart. Although the heart has been described as a pump, it is in fact two pumps. The left side of the heart is the first of these. It receives blood from the lungs which has a plentiful supply



of oxygen in it, and it sends this blood through the arteries to the rest of the body. The right side of the heart receives blood back from the body. Now, it has far less oxygen in it and a lot of carbon dioxide waste from the cells which the body must get rid of. When this blood returns through the veins, the heart sends it to the lungs, where it get rid of the carbon dioxide and stocks up with oxygen again as we breathe. The heart pumps the blood by squeezing itself up and relaxing. You have no control over this; the heart pumps blood around your body about 100,000 times a day, and it does so very efficiently.

Who is Anastasia?

In 1917 the Bolshevik revolutionaries in Russia forced the Tsar, Nicholas II, to abdicate, and then imprisoned him and his family, his wife, his son and four daughters, in various places in Russia. Then in 1918 an announcement came that all the royal

family, as well as four of their servants, had been killed. No bodies were ever found, and there was doubt at the time as to whether all the royal family were killed. Several people later claimed to the members of the Tsar's family, and the one who seems to have the strongest case is a woman who claim to be the Tsar's youngest daughter, Anastasia. Although some relatives of the Tsar refuted her claim, others have confirmed it. Her claim is still being urged by her friends and certain members of the Romanov family. If she is indeed Anastasia, she may be able to tell the world exactly what happened to her family, and so solve a very puzzling mystery.

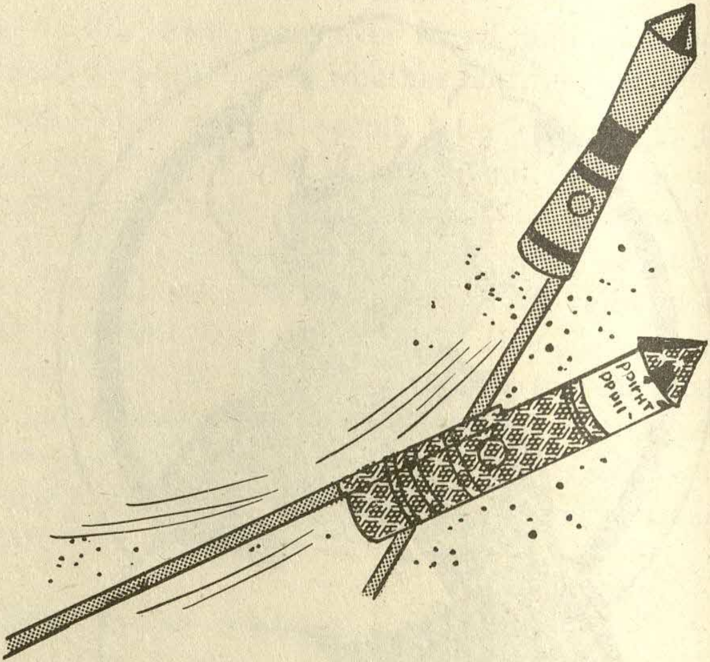
What is an albino?

An albino is a person or an animal without any colour at all in their skin except red caused by blood vessels. This is quite rare, and means that person has very white skin, white hair and pink or red looking eyes. The red colour appears because there are lots of blood vessels in the eye. Albinos live all over the world - there are albino people in Africa, where rest of their family is the colour you would expect. As well as being striking to look at, albinos also have problems if they live in sunny countries. Because they have no colour in their skin, they also have little or no protection against the harmful rays of the sun, and can burn very easily unless proper care is taken. Albinos also have no colour

in their eyes, which means that there is little or no protection against strong light, so many albinos have to wear dark glasses for most of the time.

How old are rockets?

Although rockets may have seem to be a very new invention, they are in fact very old. Not of course the type of rocket which takes people into space, but the sort we regard today as a firework. This



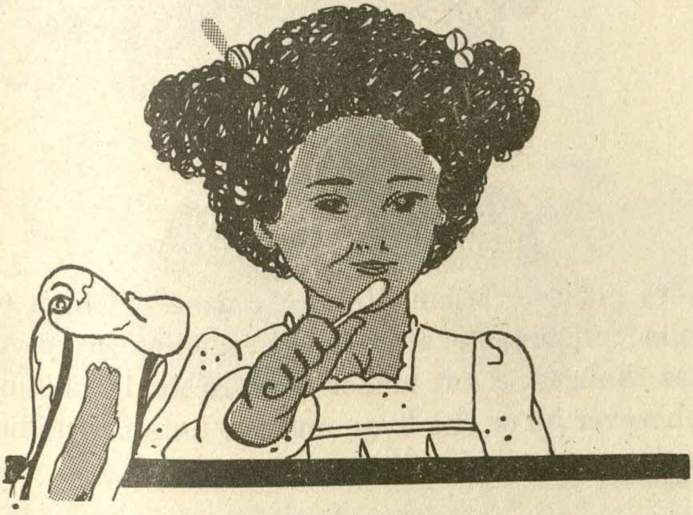
type of rocket was known to the Chinese over thousand years ago!

How many sets of teeth do we grow?

People grow two sets of teeth during their lifetimes the primary or baby teeth, and the second, permanent teeth.

The first primary teeth appear when a child is about six months old. The rest of them erupt between sixth and thirtieth month, and there are only twenty teeth in this set.

The permanent teeth in humans appear between the sixth and fourteenth years of a child's life. In many cases, the children still have their baby teeth as well as the permanent set, or some of them, until they are about ten or twelve. This can look very odd, because the permanent teeth are often bigger than the baby teeth, and because the first of the second set to appear are usually the two



front teeth, making the child look very peculiar. There are thirty-two teeth in the second set, although the four wisdom teeth don't usually appear until the person is in his or her late teens or early twenties. It is as well to remember that this set is the one you will have for the rest of your life, so great care must be taken to make sure that they won't go bad and have to be pulled out!

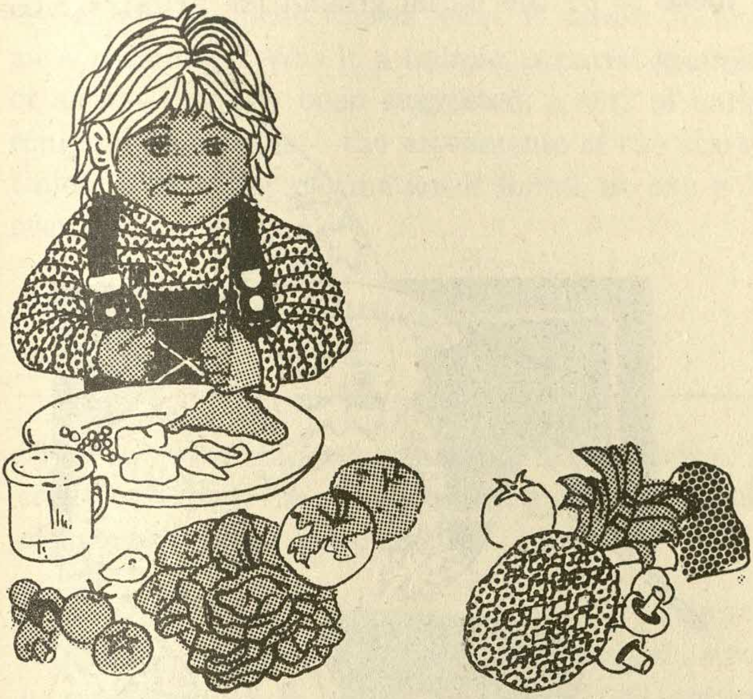
Why is hat-making called millinery?

Long ago, the best hats and headdresses in Europe

were made in Milan, Italy. A citizen of Milan was called Milaner, and although the spelling of the word has changed, a hat maker is still called a milliner, wherever he or she lives, and the hats the milliner makes are called millinery.

Why do we need water?

Very simply - because our bodies are about two thirds water. The human body contains about eleven gallons of water, and as we get rid of our body water by sweating and other means, we must replace it. The water in our bodies is not the same as ordinary drinking water, of course. There are many chemicals in it, which the body needs to grow and repair itself, and the water moves these substances around inside the body so that each part gets the amount it needs. Although on some days you may not drink as much



as on others, you take in water from the solid things you eat - vegetables, fruit, meat and bread are about a third water themselves.

Blood is mainly water. About a gallon of all water in our bodies is in the blood, but that level always remains the same, no matter how much you drink.

What is Stonehenge?

One of the stories about the time of King Arthur is the tale that Merlin the magician brought over from Ireland by magic the stones which form Stonehenge, Wiltshire, and that they were placed there to be the burial ground for Arthur's father

Uther. In fact, although this is a nice story, it cannot have happened. Stonehenge was already completely built fourteen hundred years before the birth of Christ,about two thousand years before the time of Merlin and Arthur. Nobody knows exactly why Stonehenge was built. It appears to us to have no use at all, but who knows what it meant to the ancient Britons? Was it a temple, a burial ground, or as has recently been suggested, a sort of early computer to calculate the movements of the stars? Unless some new information is found, no one will ever know.

Who invented Photography and when?

There was no single 'inventor' of photography. It *evolved* through the combined work of many people of many different nationalities.

One Frenchman, Joseph Nicephore Niepce (1765-1833), often gets the credit, however, since he was the first to obtain a picture 'from nature' with a camera, in the modern photographic sense. He was also the first to 'fix' a picture, so that it did not immediately deteriorate, though the result was still not as permanent as with a present-day 'fixer'

A plaque near the estate where Niepce used to live reads: "Dans ce village Nicephore Niepce inventa la Photographie en 1822". Experts, having examined the metal plate used in this first photograph, think 1826 is probably more accurate.

It was in 1839, when the painter Jacques Daguerre's process was made public, that the subject of photography became known. Daguerre had modified

Niepce's work to produce his daguerreotype. It was recorded that "opticians' shops were crowded with amateurs panting for daguerreotype apparatus, and...everyone wanted to record the view from his window."

What are reflexes?

Most of the movements we make are completely under our control, but some, the *reflex actions,* are not. A reflex action is an automatic response to a stimulus, for example pain, and we cannot control it at all.

If you were to touch something very hot, your hand would automatically be pulled away before you had realised that it was burning. This is because the nerves in your hand send a message to the brain, which immediately sends back the message which pulls the hand away - all in a split second.

Other examples of reflex actions are blinking when a spec of grit gets in the eye, and the way your mouth waters when you think of certain foods.

What is taste?

Taste is one of the five senses, the others being sight, smell, touch and hearing. Our chief organ of taste is the tongue, which is covered with tiny cells or *taste buds.* These react to different tastes and send messages to the brain.

You may be surprised to learn tht there are in fact only *four* kinds of taste: sweet, sour, salty and bitter. All the flavours we know are a combination of these four.

Just as there are four kinds of taste, so there are four kinds of taste bud, and these are situated in different areas of the tongue. Only the centre of the tongue has no buds at all, as you will see if you put a little salt on the middle of your tongue. Experiment with other flavours to find the areas of taste buds on your tongue, and then see how placing an ice cube on your tongue affects your sense of taste.

What is balance?

Balance is what keeps us upright, although we tend to take it for granted unless we are standing on a swaying bus or crossing a narrow bridge. But how do we know when we are upright? The answer lies in our ears, in three small tubes called *semi-circular canals.* These canals are filled with liquid and they act very much like a spirit level. When we tip them the liquid flows to one side and bumps against special nerves which immediately send messages to the brain, telling it how far we should move to regain our balance.

There are three of these canals in each ear, although they have nothing to do with our hearing. One canal is concerned with twisting movements, one with sideways movements, and one with backward and forward movements.

Who invented the first thermos flask?

Sir James Dewar, in the year 1892. It consists of a double-walled flask with a vacuum between the walls. The walls are silvered and heat cannot be conducted across a vacuum. They keep hot liquids hot because the heat cannot get out and cold liquids cold because heat cannot get in. After the liquid has been poured in, a cork stopper is used to seal the flask as cork is a very poor conductor of heat.

Who invented the thermometer?

Galileo, the Italian scientist, invented the thermometer in 1593. At that time, however, it was used to measure pressure changes in relation to weather predictions, rather than to take a human temperature!

What is the origin of the Marathon race?

The Marathon is a long, gruelling race which traditionally closes the Olympic events. It is taken from the amazing achievement of the Greek runner Pheidippides, who ran over twenty-six miles in four hours, taking news to Athens of the Persians' defeat at the Battle of Marathon in 490B.C.

Who was Sir Isaac Newton?

Sir Isaac Newton is often considered to be the world's finest scientist. Born in Lincoln in 1642, he studied at Cambridge and went on to discover the law of gravitation, and invent the first reflecting telescope. He was knighted in 1702 and died in 1727. He is buried in Westminster Abbey. He wrote his masterpiece, *Principia,* in 1687.

Where is Tower of London ?

The Tower of London, which stands on the north bank of the River Thames in London, is a mediaeval castle and includes an ancient fortress, a prison, an early Norman chapel and a former royal residence. The group of buildings is surrounded by a high stone wall and a moat. The Tower Today is a peaceful place, a showplace and museum frequented by eager tourists and sightseers. The Corps of Yeomen Warders, sometimes referred to as *Beefeaters,* help to guard the crown jewels, which are kept in the Wakefield Tower. In the museum is an extensive collection of armour, begun by Henry VIII. Soldiers from the regiments of foot-guards usually provide the Tower's garrison.

The Tower of London holds an important place in English history. The construction of the Tower was started by William the Conqueror and, until the reign of James I, the Tower was a royal residence.

Many famous people, however, have been imprisoned there. Sometimes the prisoners were taken there by boat, entering by the river entrance known as *Traitor's Gate.* Among the famous prisoners to have been there are Lady Jane Grey, Anne Boleyn, Sir Walter Raleigh and Sir Thomas More. The last well-known prisoner there was William Joyce, sometimes called 'Lord Haw Haw'; Joyce was confined in the Tower until his execution for treason in 1946.

What is Vedic?

Vedic literature is the sacred literature of the Hindus. Its four main works are the *Rig Veda*, the *Sama Veda,* the *Yajur Veda* and the *Atharva Veda.* Each Veda contains collections of hymns called *Samhitas,* most of which were composed by unknown holy men as long as 4,000 years ago.

Ancient Vedic wisdom is recorded on palmleaf books.

How did Chess Begin?

Chess is said to be the oldest game in the world, originating in India 5,000 years ago with the Buddhists, who, believing war to be wrong, devised the game of chess as a peaceful substitute. From India the game spread to Persia, Arabia and then to Western Europe. The word 'chess' is derived from the Persian word 'shah' meaning king, and 'check-mate', from 'shah mat', the king is dead. At one time the king could be captured, which would be impossible in today's game, and in ancient times the queen was the weakest piece on the board, only finding her present power 500 years ago. The method of 'castling' was introduced to the game 400 years ago, and the rook got its name from the Indian word 'ruhk', meaning soldier.

How does a submarine stay under water?

You may have noticed that an empty bottle will float along the surface of water, but one which is full of liquid will sink. The submarine works in exactly the same way. Each submarine has several large tanks, which can be filled with either water or air. When they are filled with air, the submarine will float on the surface of the water, just like a ship. When it is time for the submarine to dive, large amounts of water are pumped into the tanks, so making the vessel much heavier. By regulating the amount of water and air in the tanks, the crew of the submarine can make their vessel rise or sink to various levels in the water.

Why doesn't one key open every door?

There wouldn't be much point in locking your door if you knew that anyone could come along with another key and *un*lock it! Locks and keys are made for keeping things safe from burglary or damage, and you should always lock up a house if you are going out, or a car if you are leaving it parked in a public place. There are many different shapes and sizes of keys, and each one fits into its own particular lock. The lock will be shaped inside so that it will only take its own key. If a key is forced into it which does not fit exactly, the lock will not turn, and the door will stay shut. Unfortunately, many burglars learn various tricks by which they can force a lock open, and so anything which is particularly valuable is usually protected by other devices, such as alarms, 'combination' locks, or one of the most effective deterrents - a guard dog.

Why do soldiers wear khaki?

Soldiers wear khaki for camouflage, of course, to ensure that they blend with their background and make them less easily spotted by their enemies.

In early times camouflage was not so important to soldiers; fighting at that time was usually hand to hand, and distinctive uniforms were necessary so that the combatants could discriminate between friend and foe. The uniforms were as colourful as possible, and were covered with feathers, ribbons and other decorations to give the fighting men a sense of unity, a feeling of belonging to, and being a part of their own regiment.

But with the invention of the breech-loading gun and long-range artillery, camouflage became very important indeed, as the British soldiers fighting in the American War of Independence found to their cost. Many of the Americans had no uniform as such, and wore their usual hunting shirts, whose neutral colour gave them good protection. The British soldiers, in their red coats and white breeches, presented perfect targets, and were unable to melt into the landscape.

In the 1840s Lieutenant Harry Lumsden was forming a regiment of cavalry and infantry in northern India, and was given permission to arm and dress his men as he wished. Since their duties would involve skirmishes with the natives he decided that his men should wear uniforms the colour of the local ground, so that they would be inconspicuous, and had cloth specially dyed locally. It was called khaki after the Urdu word for dusty, and when Lumsden's regiment went into action in 1849 they were known as the 'Mudlarks'.

The success of the khaki camouflage led to all British soldiers being issued with khaki uniform when they were posted overseas, though colours changed slightly in accordance with the surrounding countryside.

When the First World War started in 1914 some cavalry regiments wore their traditional colourful uniforms, but they soon changed to khaki, the colour of the mud in the trenches and the dust of the roads they had to travel.

Today soldiers all over the world dress in khaki, glad of the protection it affords them. The bright, colourful uniforms that once glamourized war have disappeared.

Who Invented the Match?

From earliest times, in all parts of the world, people have made fire by rubbing a hard stick against a soft stick so that soft flakes of wood, sloughed off by the hard stick, started to smoulder. Another way was to use flint, a very hard stone, striking it against a lump of iron to produce sparks.

Until the eighteenth century, the only improvement on these primitive methods was the tinder box, which contained a piece of steel, flint and some dry tinder for the sparks to ignite. Tinder was often pieces of charred linen or silk; sometimes even dried fungus. The process of raising a spark could be very time-consuming, especially if the tinder was cold and damp.

Matches were first invented as a method of transferring the flame from the smouldering tinder to where it was needed. Splinters of pine were used, their ends dipped in sulphur, which flared easily and made dangerous fumes. It is thought that the Chinese used similar sulphur matches as long ago as the sixth century. For a time sulphur matches were cheap and popular, but still the tinder box was needed to make the initial spark. All over Europe scientists were trying to do away with the need for the tinder box.

The first real breakthrough came in 1827 when English chemist John Walker invented a match with *all* the fire-producing compounds in its head. He called them 'friction lights', because the flame was created by friction, and soon the idea was taken up by large manufacturers who made them in their millions.

However, with friction lights there was a danger that they would ignite accidentally. A Swedish scientist came up with the idea of the safety match in 1845, putting only some of the chemicals on the match head and the rest on the side of the box. The match would only ignite when struck against the box.

Who Invented the Cigarette?

The cigarette was the last method of taking tobacco to be developed. Previously it had been smoked in pipes and cigars, inhaled as snuff (in powder form) and chewed. Tobacco itself was brought to Europe and the rest of the world when Columbus discovered America, and it was thought to have marvellous medicinal properties.

No one could be said to have actually invented the cigarette. It began as a kind of cigar. Cigars were made in Spain, by hand, and were very expensive.

The story goes that the beggars of the Spanish city Seville used to collect up the cigar butts thrown into the street, shred the tobacco from them and roll it into paper, which they smoked. They called these concoctions *cigarillos*: 'poor man's smokes'.

Whether or not this is true, the idea of smoking tobacco rolled in a piece of paper spread slowly through eighteenth century Europe until it reached France. Here the new smokes were given the name 'cigarettes'. There were several reasons for their popularity; they were cheaper than cigars, less trouble than a pipe, and more fashionable than snuff. A man would carry his own tabacco and a booklet of paper from which he would form his own cigarettes.

Cigarette smoking finally reached Britain in the 1850 when soldiers fighting in the Crimean War picked up the habit from the Turks and Russians. From there it spread to America, where tobacco had first been discovered, centuries before.

At first, cigarettes were made by hand, but in 1880 an American invented a machine to do the job, increasing the numbers made every year from 500 million to 4,000 million - in America alone! Today, a cigarette machine can make 12,000 to 16,000 cigarettes every minute.

What would we do without Salt?

Everyone needs salt to stay alive: It's absolutely essential to our systems, and is found in most of the foods we eat. Britain alone produces two and a half million tons every year - and every ounce is used up!

In fact, we need salt so much that when a group of criminals in Sweden were once given the choice to do without salt for a month, as an alternative to capital punishment, those who agreed were dead within the month! We take salt very much for granted these days, but in earlier times it was very highly prized; wars were fought simply to obtain salt, and it is true that as late as this century the people of Sierre Leone were willing to sell their families for salt.

There is a fascinating city made of salt, carved underground in the salt mines of Wieliczka, Poland. You can walk around admiring churches, monuments, streets and even railway stations - all carved from salt! And to prove just how important salt used to be to us, our word 'salary' comes from the Latin 'salarium', meaning money for salt.

What would we do without Coal?

Coal is something which we all need in some way or other. We need coal to produce heat and light for our homes and offices; our industry needs coal to provide many commercial and household goods to export all over the world.

Different types of coal are often found in a coalfield. There are 'coking coals', for instance which, when mined, aren't used for home consumption but are valuable for the blast furnaces of a steel works. Then there is anthracite, a hard kind of coal which burns with a very intense heat.

Coal is still mined today by men going down into the earth and risking their lives to bring the coal from the seams up to the surface. Despite a great many new safety measures mining is still a difficult and dangerous job. At least the practice of taking children to work down the mineshafts has ceased now, although pitponies are still used to pull loads of coal underground.

There are quite a few mines in Britain, mostly in Wales, Scotland and North-East England. A world famous mining area is that of the Ruhr valley in Western Germany.

What would we do without Soap?

This is something that everyone uses at least once every day! But about a hundred years ago soap was so expensive that only very rich people could afford it.

Soap is made from different fats and oils. We import these oils from other countries, as we need coconut and olive oils and whale fats, as well as some other animal fats. These oils and fats are all heated up together, with caustic soda, which is an alkaline solution. Heating these ingredients produces glycerine, which is used for other purposes, so this is separated from the soap mixture.

The soap, which by now has formed a curd, is boiled again, to remove all traces of salt. After this, it is given its perfume and colourings. Left to cool in long bars, it's then cut up and wrapped for us to buy.

Soap is really a 'dirt loosener'. It dissolves in water, so the soap in the water surrounds the specks of dirt on our hands, and loosens them from the skin. Then, as we move our hands in the water, the specks float away with the water, leaving our hands clean and fresh!

What would we do without Wool?

Wool has kept us warm since very ancient times when man first domesticated sheep, and even in this age of synthetic fibres wool still remains a firm favourite with most of us. Britain, especially, has a lot of sheep grazing on the hills of Scotland, Wales and Ireland, and has a thriving wool industry.

Britain was very important when it came to wool-producing in the Middle Ages, and a sack of wool became a status symbol of wealth, hence the Lord Chancellor's seat in the House of Lords becoming known as the Woolsack. All in all, the sheep population of the world is about 970,000,000!

When shorn, the sheep's fleece is matted and oily and unfit for spinning, so the fleece must be washed and 'carded' before going on to the next process. Once spun, the wool goes on to be woven into the woollen clothes and rugs, carpets, etc., we are familiar with in the shops. In the Middle Ages the Flemish were celebrated weavers; these days bradford and Leeds are wellknown for their fine weaving!

Which American President was born in a log cabin in Kentucky?

Abraham Lincoln. Later the family moved to Indiana where the family built a 'half-face' which was a three-sided shelter, framed with poles and thatched with bark. He ate wild berries and learned to shoot wild turkeys for food.. Later still the family went by covered waggon to New Salem, and years later his new home became the White House in Washington, D.C.

Who was Indira ?

Indira Gandhi was the first woman Prime Minister of Independent India.

Indira Gandhi was born on 19th November 1917 in Allahabad. At that time there was great political tension in India. India was struggling hard to gain Independence.

Her father Jawaharlal Nehru, a great Indian leader, and mother Kamla Nehru gave her a second name as well – Priyadarshini, or "dear to behold".

After schooling, Indira went to the Visva-Bharati University founded by Rabindranath Tagore.

In 1938, Indira entered Somerville College, Oxford. Those who studied with her remember her as a quite but strong-willed person.

Indira married Feroze Gandhi on 26 March 1942.

Although politics was her first interest from a very young age, Indira Gandhi was inducted into the main committees of the Congress Party at a much later stage, and in 1959 she was elected its President.

In September 1960 Feroze Gandhi died of a heart attack. Within four years Jawaharlal Nehru was also dead. Indira Gandhi wanted to retire from active politics but the new Prime Minister Lal Bahadur Shastri insisted that she join his Cabinet. She was given charge of the Ministry of Information and Broadcasting.

Shastri's stay in office was short. Early in January 1966 he died unexpectedly. The country had to find a new Prime Minister. The leaders of the Congress thought that Indira Gandhi would be the best choice. Indira Gandhi easily won the election, and she was sworn in as Prime Minister on 24 January 1966. She was to remain in that office for eleven years.

In March 1977, Indira Gandhi called for an election, her party was soundly defeated. But it was not long before the tide of people's sympathy began flowing back towards Indira Gandhi. She won a by-election to the House of Parliament. However the house expelled her and she had to spend some days in jail.

The groups which had formed the new government broke up. The new government was compelled to call a general election half-way through its five year term. In January 1980 polls, Indira Gandhi was swept back to power.

Despite her popularity, Indira Gandhi, like all political leaders, had her share of enemies. On the morning of 31 October 1984, as Indira Gandhi came out onto the lawns of her house for a television interview, her enemies shot her dead. She was nineteen days short of her sixty-seventh birthday.

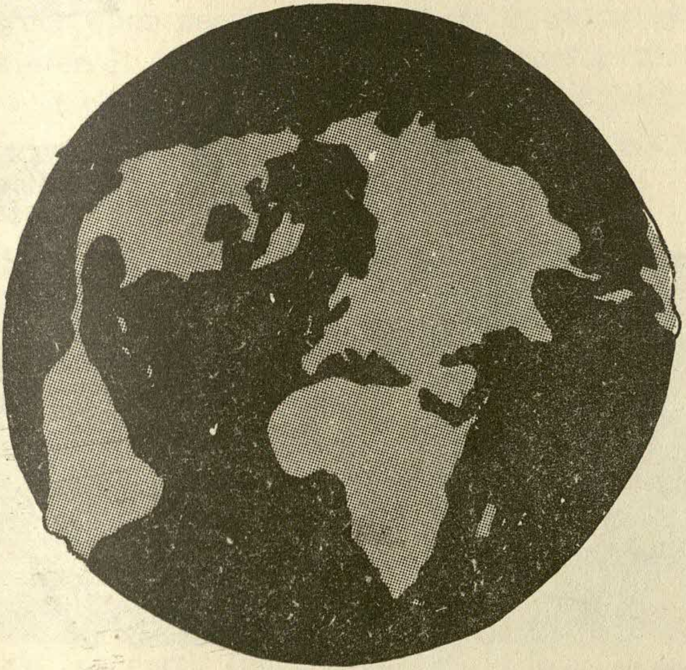
Only the evening before her death she had spoken to a large gathering a thousand miles away from Delhi, and said:

I am here today, but I may not be here tomorrow. Nobody knows how many attempts have been made to shoot me. I do not care whether I live or die. I have enjoyed a long life and I am proud that I spent the whole of it in the service of my people. I shall continue to serve until my last breath. And when I die, I can say that every drop of my blood will invigorate India and strengthen it.

THE EARTH

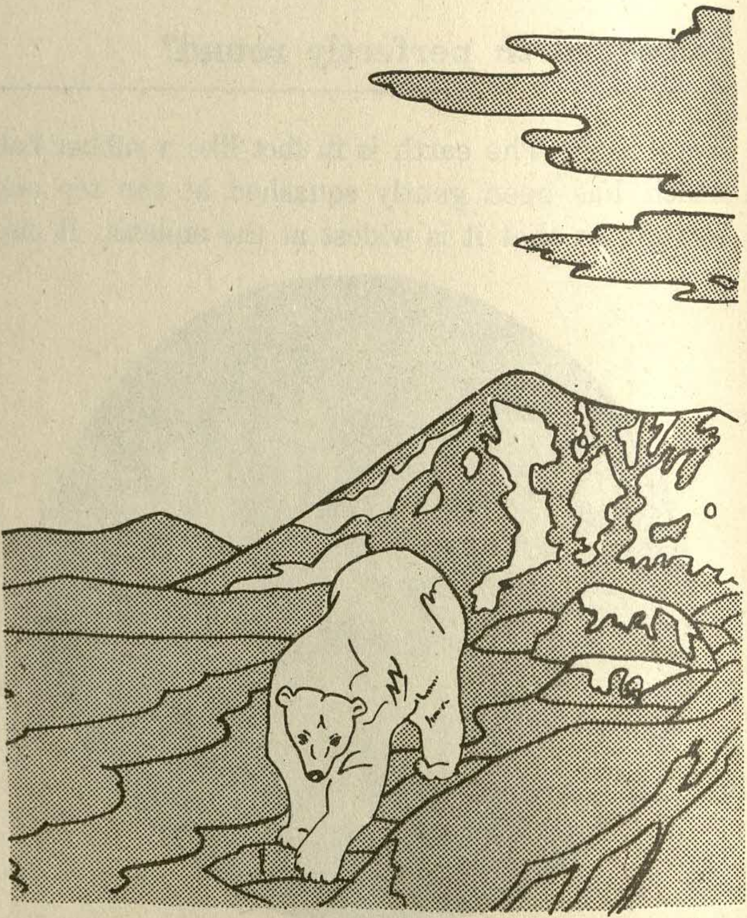
Is the earth perfectly round?

No, it isn't. The earth is in fact like a rubber ball which has been gently squashed at the top and bottom, so that it is widest at the equator. It also has four bulges which form rough corners. These are in Ireland, and near the countries of Peru, South Africa and New Guinea. Scientists call the earth's shape an 'oblate spheroid'.



Is there a place where the sun never sets?

In a way, this is true of the north and south polar



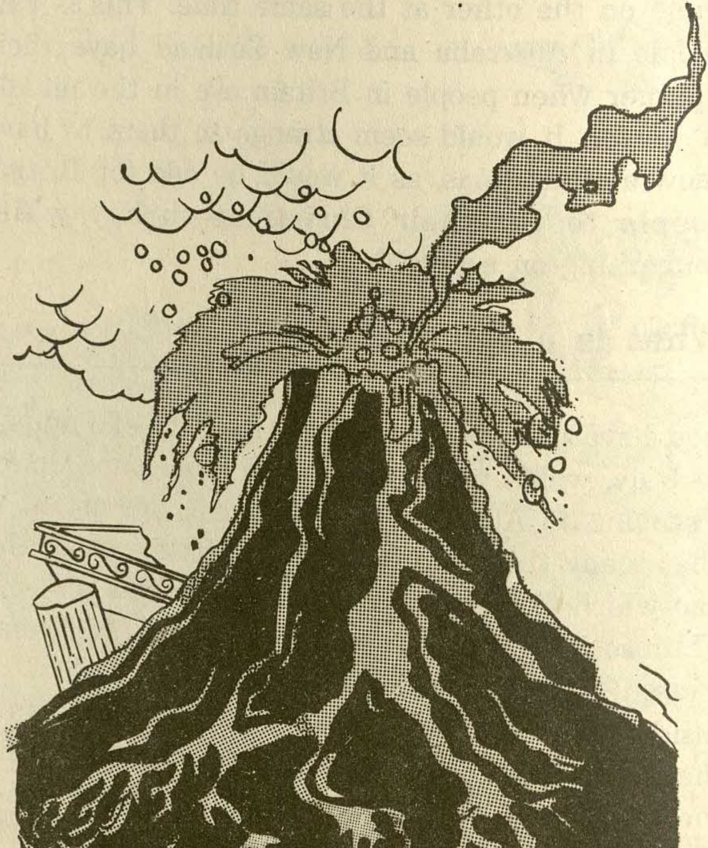
regions, and is caused by the tilt of the earth in relation to the sun. In fact, summer at the north pole is a time when the sun never actually sets from March to September, because the earth does not tilt enough for it to disappear below the horizon. The sun does sink in the evening and rise in the morning, and during the night there is a sort of odd half-light over the polar region. Winter is very similar, in that the days as well as the nights are very dark from September to March. At the south pole, the reverse happens - summer there takes place at the same time as winter in north, because the two poles are at opposite ends of the earth, so that when the sun is shinning on one it cannot shine on the other at the same time. This is why people in Australia and New Zealand have their summer when people in Britain are in the middle of winter. It would seem strange to them to have snow at Christmas, as it would be odd for British people to eat their Christmas turkey while sunbathing on a beach!

What is a volcano?

You have probably read about the city of Pompeii in Italy, which was destroyed by a volcano, Mount Vesuvius, in AD 79. The reason it is important is that many things were preserved as fossils in the ash which fell on the city, and so Pompeii is a sort of museum about the Roman way of life. But what caused the volcano to erupt?

Inside the earth there is a mass of rock so hot that it is in fact liquid. In some parts of the earth, the crust - the outside layer - is cracked or thin. This means that the liquid rock inside the earth can force its way out, and form a volcano by blowing a hole in the surface of the earth. When the liquid rock bursts out of the volcano, we call it *lava*, and the volcano also pushes out ash, smoke, steam and lumps of rock with the lava. As the lava itself is still very hot and liquid when it emerges from the mouth, or crater, of the volcano, it causes a lot of damage and can destroy everything in its path by setting it on fire and then engulfing it.

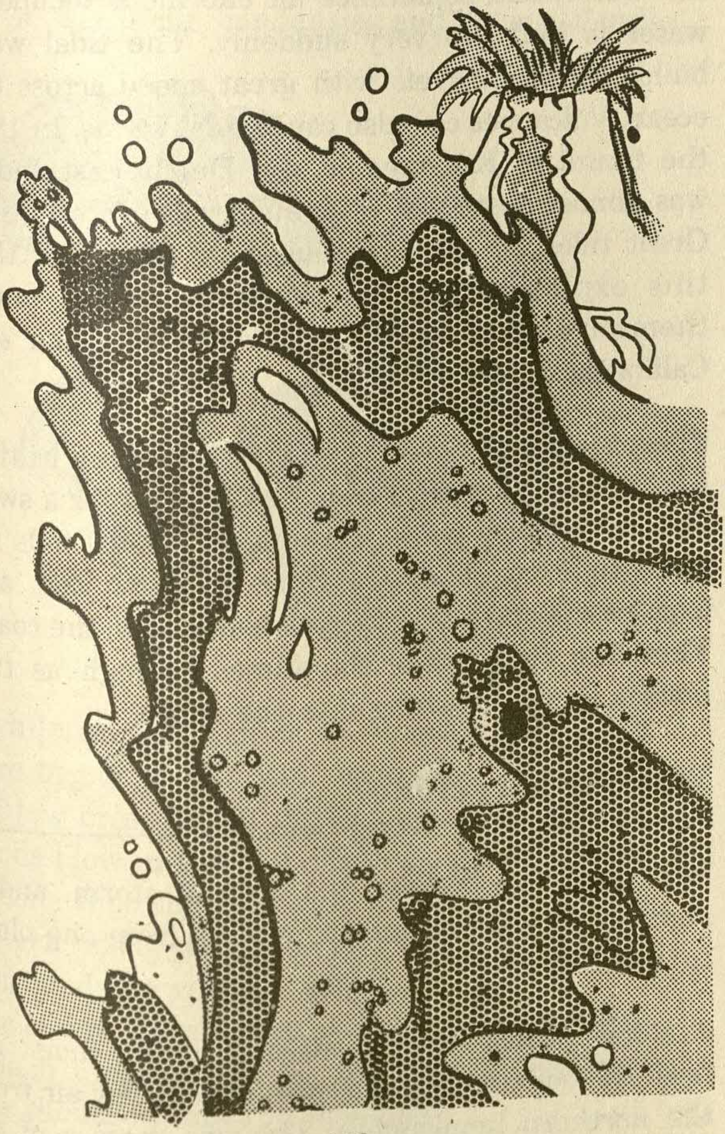
Volcanoes do not occur all over the world, but there are many of them. Some are active, which means



that they belch out lava and smoke quite steadily, and others are dormant or inactive. These can stay quiet for centuries, but scientists keep an eye on them in case they should suddenly erupt.

What causes tidal waves?

Tidal waves, or tsunami, as scientists call them, are very often the result of earthquakes on the bottom of the ocean. The sea bed shifts and slides



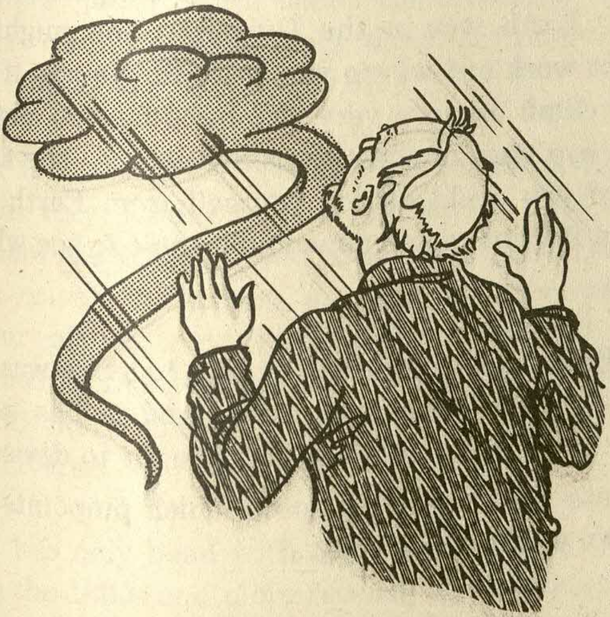
like an earthquake on land, causing a great shock wave. Ships that are in the area of the quake feel this shock wave as if they had just struck a rock. Sometimes the shock causes a great depression in the water, and sometimes an enormous mound of water is built up very suddenly. The tidal wave builds up and travels with great speed across the ocean. Volcanoes can also cause tidal waves. In 1883 the island of Krakatoa in the Dutch East Indies was almost destroyed by a huge volcanic eruption. Great tidal waves were caused by the shock that this explosion started, and the waves made themselves felt on the coasts of Australia and California thousands of miles away.

There are warnings signs on land which tell us that a tidal wave is approaching. Firstly, there is a swell like an ordinary wave. Then the sea level falls for some time, as though it were very low tide, and exposes a large area of the sea bed around the coast. Then the tidal wave, sometimes as high as two houses, comes crashing into the shore.

What is a cyclone?

Very simply, a cyclone is a kind of storm, and a storm is air which is moving quickly from one place to another.

A storm begins when a mass of warm, moist air from the equator meets a mass of cold, dry air from the northern hemisphere. The two masses of air will not mix - instead they form a front, which is just the name for the boundary where the two meet. The air in them continues to move, and the warm air rises above the colder air, becoming cooler as it does so. Then the moisture which was in the mass of warm air condenses and forms clouds.



Meanwhile, at the centre of the storm, the air pressure begins to fall, and winds blow round this area of low pressure. In the northern hemisphere, the winds blow in the anti-clockwise direction, and this means that the warm air moves north round the eastern side of the storm, and the cold air moves south around the western side.

So a cyclone is just another word for a low pressure area. Such cyclones can be enormous, sometimes about a thousand miles in diameter.

Where is the Earth?

If you have ever been lost in a city or even a large town without the help of a street plan you will have some idea of the problems which confronted scientists of old when they tried to imagine exactly where Earth was in the Universe. You might be able to work out where you were in the city if you could climb on to a very tall building and have a bird's eye view of the city as a whole. In the same way, if you could detach yourself from Earth and look at it from space you would be able to see where it is.

The Earth moves around the Sun but this was not at all obvious to our ancestors and it has taken many generations of scientific thought to devise an accurate 'street plan' of space which pinpoints the Earth's position correctly.

Like us, our forefathers could look up at the night sky and observe a constantly changing pattern of bright objects including the much larger Moon. We know now that the Earth is just one of nine planets which together with their satellites (moons), a belt of smaller rocky bodies called *asteroids*, some *meteors* which appears to us as shooting stars, and one or two *comets* are all orbiting around the Sun some 140 million kilometres away.

This arrangement of various heavenly bodies is calle the *solar system.* But what of all the other myriad points of light which we usually refer to simply as stars? From the vantage point of Earth, these stars appear to be arranged in patterns which have been given names like the *Plough* because of their resemblance in outline to more familiar objects. These patterns are called *constellations* but they may be made up of stars which are many millions of kilometres from each other.

In fact, each one of these pin-pricks of light is a sun very similar to our own except that some of them are yoiunger and cooler and appear to be red in colour and others are hotter, older, and blue. Our solar system is just one of many similar systems which all fit into a larger arrangement called a *galaxy*, and there are millions of other galaxies in the Universe.

It has only been with the coming of the telescope in the 1600s and more recently radio telescopes and satellites that we have been able to establish our 'street plan'. Our ancestors believed that the Earth was at the centre of things. Some ancient civilizations believed that our planet was supported by huge animals such as elephant and whales. They could be forgiven for thinking that the sky was like a gigantic domed roof with the Sun, the other planets and the stars suspended from it.

How does the Earth keep warm?

This is a question that you have answered for yourself every time that you have been sunbathing. Almost all of the Earth's heat, and this means its energy, must come from the Sun. In addition to this the interior of the Earth has retained much of the heat which was generated at the formation of the Earth. This internal heat came from energy released as the Earth contracted as well as from heat given off by the decay of certain types of radioactive materials. No plants would grow without the Sun, and therefore, no animals and no man. Without the Sun, our planet would be a frozen, barren waste.

Why are there waves on the sea?

Only very rarely are the seas completely still. These were the times that sailors on the old sailing ships feared the most - even more than they feared the worst storms. They became becalmed, which meant that no wind was blowing to fill the great sails to carry them to their next port of call. The sea would be motionless and mirror-like and no rain would fall. If the sailors were held fast for too long their food would begin to run out, and perhaps more important fresh water would become scarce.

You may have guessed by now the connection between waves on the sea and the wind. In fact, waves are almost wholly the result of the wind blowing across the surface of the water. Perhaps you have played 'blow' water polo at home. You need a table tennis ball, two pieces of tube and a bowl full of water. Float the table tennis ball in the bowl and blow through the tubes. As you blow on to the water you will notice that the surface is stirred up into ripples - the harder you blow the bigger the ripples.

It is very similar on the sea. The wind drags the water to form waves which slowly move forward and get larger. Although the wave shape moves forward, each particle of water moves round in circles and does not change its average position. The height of a wave depends upon three factors. How hard the wind is blowing, how long the wind has been blowing, and the *fetch*. The word fetch means the length of the stretch of open water over which the wind is blowing.

What causes the changes of sea-level?

We know how great sheets of ice extended over many areas of the Earth's surface at certain times during geologic history called Ice Ages. The water which made up these icy masses came from the seas so that the sea-level fell, but at the same time the weight of the ice pressed down upon the Earth and when the ice retreated the land bounced back up again. The areas of the Baltic still seem to be rising from the melting of the ice from the last Ice

Age. Local sea-level changes may occur for many other reasons such as earth movements.

Why does a volcano erupt?

By now you should be aware that in the bowels of the Earth all is not still. On the contrary, it is very active. One obvious example the the Earth's internal workings is the activity of volcanoes. There are many famous instances of a volcano erupting and spewing white hot, molten rock from its mouth; if you have been to Pompeii or just seen pictures of it you will realize how a whole city and most of its inhabitants can be engulfed in the fiery ash suddenly erupting from what was thought to have been dead volcano. A more recent example was the eruption of Mount Saint Helens in the United States in 1980. This eruption had the force of 500 of the nuclear bombs dropped on Hiroshima in 1945. Perhaps the most famous of all volcanoes is Krakatoa. This volcano had remained dormant for 200 years, when on 27 August 1883, the volcano exploded with such force that the whole island was ripped apart. The noise was heard almost 5000 kilometres away in Australia, and as tidal wave of 36 metres high was sent across the sea to Java, killing 36,000 people. You can understand, then, that it is a very great force that makes volcanoes erupt.

Volcanoes were once thought to be burning mountains and it is not difficult to understand why.

But nowadays, a volcano is usually defined as a direct feed from a magma chamber in the interior of the Earth to the surface, Remember that a magma is any hot material within the Earth which can flow and penetrate into or through the surface rocks. A magma, then, is usually thought to consist of a kind of 'porridge' of solid rock material, liquids and semi-plastic substances which are made to flow by the lubrication of hot gases under great pressures.

Two main causes are responsible for the birth of a volcano. Explosive eruptions may be caused by pressure resulting from the build up of gases within the Earth or a crack in the crust can be opened up forming a passage or *vent.* Volcanic lava can then flow through it.

It is important to remenber that the classic cone shaped body which you might immediately think of as a volcano, only forms as a result of volcanic activity. It is the pile of ash and cooled lava that has flowed or been thrown out of the original fissure or crack. A volcano may erupt only once, and it may not emit enough material to build up the well-known cone. This cone usually occurs when there are successive eruptions from the same vent.

Where do you find volcanoes?

We expect you know where there are some active volcanoes either today or in the very recent past, because when one erupts it always makes the headlines in the newspapers. for example, we have already mentioned the eruption of Mount St Helens, and, of course, Mount Etna in Sicily is still active as are some of the volcanoes on the Hawaiian islands. Perhaps the most spectacular of the recent eruptions took place off the coast of Iceland when suddenly a new island, Surtsey, was born of the eruption. In fact, there are almost 800 volcanoes which are eithr active today or have been noted as having erupted during recorded history. Are all these volcanoes dotted the surface of the Earth at random or can we see any sort of pattern in their distribution? And if there is a pattern. is it significant?

The answer to both of these questions seems to be yes. If we look at a map of the world which shows all the active volcanoes, we would see that about two-third of them are situated around the edges of the Pacific Ocean including many on the groups of islands. This grouping of the volcanoes is often referred to as the 'Pacific ring of fire'. Of the remaining volcanoes, a number can be seen ranging along the centre of the Atlantic ocean. it has been shown that this line of active volcanoes follows what is known as the mid-Atlantic ridge. This ridge is extremely important as a line of volcanic activity. There are two other areas where there are concentrations of volcanoes. In and around the Mediterranean area includes Etna and Vesuvius. The other area is east Africa where Mount Kilimanjaro is a good example.

It is also very important to note that although there may be slight variations from volcano to volcano in any one of these groups, each group tends to erupt similar products with similar compositions. For example, the mid-oceanic ridge volcanoes erupt basalt lavas while volcanoes in the 'ring of fire' often erupt lavas of andesite which contains more silica.

The significance of these patterns of volcanoes is concerned with the drifting of the continents. Suffice to say that the Earth's crust is made up of a number of rigid plates 'floating' on the mantle below. Concentrations of volcanoes are usually associated with the margins of these plates.

Can rocks bend?

When you pick up a pebble on the beach, it is hard to imagine that this solid material rock, can be bent just as though it were toothpaste. Throughout the world, however, you can find large areas of exposed rock that clearly show the evidence of bending. It is also important to realize that it is the bending and upheaval of the surface rocks which give rise to the basic structure from which the landscape is moulded. Some of the *folds* which have been formed in beds of rock are so large that you cannot see their complete shape. Their existence can be proved by other methods.

Geologists try to simplify the business of examining folded rocks by giving charactristic forms names. Take a piece of paper to help you learn some of the folds that can be seen in nature. First of all, bend the sheet into a gentle curve and hold it so that the bend is at the top as you look at it. When rocks are bent into this shape it is called an *antiform.*

Now, instead of using just one sheet, do the same thing with a number of sheets held together. Try to imagine that each sheet of paper is a bed of rock and that the bottom sheet was the first bed to be laid down, in other words the oldest. Now hold the fold in one hand and cut off the top of the curve with scissors. You will see that the sheet that was at the bottom is now in two halves at the centre of the sheet of the paper. When this happens to folded rocks, and the oldest beds occur in the centre of an antiform, it is called an *anticline.* Sometimes if there is more than one period of movement, what was at first an anticline can be turned upside down, and the situation becomes quite confusing.

Of course, beds of rock in the Earth's crust are rather longer than your piece of paper and you would not expect to find just one fold. Take the sheet of paper and put two gentle folds in it. You will see that one has its bend at the top, the antiform, but the other has its bend at the bottom; this called a *synform.* When there are younger rocks in the centre of the synform it is called a *syncline.*

With many periods of upheaval, then, you can see that there could be synformal anticlines and antiformal synclines. Sometimes, rocks are bent into *dome* and *basin* shapes.

How do geologists help us?

All the sciences, mathematics, physics, chemistry, and biology, are playing an increasingly important role in our way of life, as the years pass and we become more dependent upon the products of science and technology. Geology, too, has a vital part to play in living today, apart from its value in furthering our understanding of the way in which our Earth began, developed, and is in constant motion to this day. For example, few of us could imagine living now without the vast network of roads and railways that span the land surface. But these roads and railways require bridges and tunnels which cannot be built in some areas or they may collapse.

By careful surveying, the geologist is able to tell what kinds of rocks there are in an area, and can suggest to the engineer the best site for their construction. Before geologists were consulted, huge contructions were often erected on sites quite unsuitable for the purpose with disastrous results. A famous instance is the San Francisquito Dam disaster in America. A quick survey was carried out on the proposed site during the dry summer months and it was decided that the narrowest part of the river channel was ideal. Unfortunately, the rocks on one side of the canyon were clays, with schists on the other. When the water filled up behind the dam the clays became soft and flowed away so that the schists broke away and the whole dam collapsed. Geologists can also help to avoid the terrible loss of life which occurs as a result of earthquakes. So far they have not been able to perfect methods of actually preventing earthquakes, but at least with the methods now available people can be warned of a coming disturbance in time to escape.

Perhaps today the geologists' skill in finding raw material is even more important. Industrialized society depends on the raw materials that the Earth provides - nowhere else can provide our needs. Our society with its demands for more energy, more water, more iron, more aluminium, more chemicals from oil and so on, now asks the geologist to find more sources for all these materials and many others. Obviously it is becoming more difficult and more costly. In time, of course, unless our demands are reduced, not even the cleverest geologist will be able to find new supplies. They will have all been used up.

What are ores, and where might you expect to find them?

You must realize that the Earth provides us with all the raw materials swallowed up by our industries.

Many of these materials are minerals. The word 'mineral' is used to denote any substance obtained by mining. It is clear that the words mine and mineral have similar origins. You might expect that minerals would be spread throughout the Earth, and indeed, this does happen. Occasionally, however, minerals may accumulate in sufficient quantities for man to be able to remove them comparatively easily. When this situation arises, the deposits are usually known as *ores* or ore bodies. The minerals associated with the ores that have no real economic value are usually referred to as *gangue* minerals. Today, because of the greater demand for minerals, the consequent scarcity of them, and improved methods of mining and refining, material that was once thrown on the spoil heaps can now provide valuable sources.

Ores can occur in a variety of ways. With ores or iron, for example, the same ore can arise as a result of different methods of concentration. Many ores other than iron are formed in association with magmatic processes. If you remember the way in which a magma cools and forms crystals, it will come as no surprise to you to learn that metals such as chromium and nickle result from the settling into bands of the relevant crystals as the magma cools. There are often watery solution charged with minerals coming from magmas and these also provide supplies of metals such as mercury or copper. Both these minerals are in short supply, and in fact, deposits of mercury are almost completely confined to areas in Spain. Not all ores have been formed by igneous activity, however.Important deposits of iron in England have resulted from concentration by sedimentary process. Deposits known as *placers* are typical sedimentary ores. Of course, oil and coal must be considered as economic minerals and these have obviously resulted from sedimentation.

The sea may one day provide much of the world's minerals. It has been known for some time that there is great richness of gold in the sea but as yet it has not been worthwhile nor even possible to exploit this mineral wealth. Even uncommon metals like vanadium, which is used for the nosecones of spacecraft, is concentrated in the blood of an unexciting sea animal - the sea cucumber.

How do animals and plants depend upon each other?

The sun is the driving force in all of the Earth's processes. It is the sun's rays that keep our planet warm enough for us to be able to survive, it is the weather's motor, and provides energy for the most important process of all so far as plants and animals are concerned. The sun provides plants with the energy for *photosynthesis*. It is by photosynthesis that plants use the sun's energy to convert carbon dioxide taken in from the air, and water from the soil into the sugars and starches that make up their stems, leaves, and roots. It is a little more complicated than this, and plants need other substances as well, but this is the important process. Photosynthesis only occurs in plants that contain the complex green pigment *chlorophyll,* in other words in green plants.

Other types of plants depend on other means of manufacturing these materials. It is interesting to note that green plants can store energy so that photosynthesis can even occur at night.

We now have the basic food supply for the rest of the planet's life forms. You know that cows, for example, eat grass. Without grass or other plant material available, cows could not survive. We then make use of the cow's ability to digest grass and convert into meat and milk which we eat and drink. Thus, the cow is a herbivore, that is, an animal that feeds on plants. When we eat meat, we are behaving as carnivores or meat eaters. This demonstrates a simple chain of events, in fact, it is known as a *food chain.* The grass grows and is eaten by the cow which is eaten by man.

There are many other such chains. A fox may feed on rabbits, which may be eating clover. The clover may be dependent not only on the sun, water, and the air, but also on bees for pollination. These chains can be disturbed quite easily sometimes with far reaching effects. For example, should bees become reduced in number for any reason, such as a farmer using insecticides, in time the amount of clover would fall back and the rabbits might be forced to feed on the farmer's lettuces. Obviously, the farmer will not be happy about this and may set about reducing the rabbit population. If he was too enthusiastic and all the rabbits in an area were to be wiped out, the fox would have to look elsewhere for its meals - it might even be the same farmer's chickens.

Try to imagine multiplying these simple chains thousands of times to take the multitudes of different animals and plants into account. Now you begin to have some idea of the complicated nature of life on our planet, how animals and plants depend upon their surroundings and each other, and how easily the balance can be upset.

Which animals and plants are in the most danger?

In this question, the word 'danger' does not refer to the danger to which individuals of any species may be subjected. Danger in this case means the danger to which a whole species is liable. In other words, species may be in danger of becoming extinct, and disappearing for ever from the face of the planet. Of course, we can tell from the fossil record that hundreds of species of animals and plants have come and gone throughout the span of life on Earth. In the past, however, those species that have died out have done as a result of natural causes. The animals and plants that disappeared were those that were unable to adapt fast enough to changing conditions or were unable to compete with their rivals for the available food supplies. There are instances, however, such as that of the dinosaurs, in which it is not at all clear why they became extinct. Many ideas have been suggested, but none of them is wholly satisfactory.

For today's wild life, there is another, more terrible threat to their existence - man. Man is endangering the lives of many species of animals and plants which are unable to adapt to the pressures of man's increasing numbers and his changes to the natural environment. On the other hand, there are those species that have certainly benefited from man's activities. In Britain, for example, birds such as the black headed gull have increased in numbers quite dramatically in the last fifty years, adapting well to a semi-urban environment and feeding on man's waste. Even the fox has been able to survive by adapting to become an urban scavenger in many large cities. Unfortunately, the lack of suitable foods has led to the foxes becoming deformed so that individual probably spend a great deal of their lives in considerable pain.

But man is threatening wild life in many ways. Firstly by his spread further and further into the rural areas, man is reducing the areas in which wild life can live. This also includes the effects of widespread farming where forests and heaths come under the plough and many kilometres of hedges are removed. Secondly, man has hunted many animals to extinction. A good example of this is the destruction of the great auk during the last century or perhaps even more famous the death of the dodo. More recently the fate of many species of the giant sea mammals, whales, has been in the news, as their numbers fall to the more efficient whaler's harpoon gun with its explosive harpoon. Pollution is also affecting the lives of many animals. Millions of sea birds die very unpleasant deaths as a result of their feathers becoming covered in sticky, black oil waste.

It is sometimes argued that if an animal or plant cannot survive man's ravages, then this is just the course of evolution. Unfortunately, many beautiful and valuable species, on which man himself depends, may never be seen again.

Who are the vanishing peoples of the world?

It is not only animals and plants that are in danger of disappearing from our planet in the face of the industrial 'advanced' nations. There are many races of people that have survived in a very simple, stable way of life for many centuries only to be threatened with destruction in the space of a few decades.

A good example of a vanishing people known to most of us is the case of the Indian of North America. Until Christopher Columbus landed his ship upon the shores of the Caribbean Islands in 1492, the

New World and its peoples were virtually unknown, and now less than 500 years later most of the Red Indian tribes are no more, and those that are left have retained little of their culture. Even the surviving tribes have such small populations that many of them may soon disappear. And America is the most powerful industrial nation on Earth.

There are many reasons for the loss of these tribes. the white men came from Europe with the hope of building a new life for themselves in the New World and escaping the poverty of the Old. In most cases, they were welcomed by the Indians. Unfortunately, the white men brought diseases with them. The Indians were not immune and thousands of them died. The coming of the railway opened up the West and supplies of food were required for the railway workers and the new settlers. As a result millions of bison which had provided the Indian with many of his materials, were slaughtered. Slowly, the Indian were driven off their natural hunting grounds on the poorer and poorere lands, and when they tried to fight back, the white man with his army and superior weapons won again.

This is a sad tale, and although it does not happen quite like this today, there are other tribes that are dying out because they cannot adapt quickly enough to the changing conditions which are being forced upon them by industrial man in his search for new lands for building, farming, and natural resources. The Bushmen of South Africa, the Pygmies of central Africa, the Aborigines of Australia, and the Eskimos are just a few of the more well-known races that are dying out or interbreeding with the white men with the loss of their own ways of life. It is thought that there are still tribes of Indians left in the Amazon jungles of South America that have not yet set eyes upon a white face, but these areas are in danger of being opened up.

As is the case with wild life, the loss of these peoples could be thought of as the natural course of evolution, because they are unable to adapt to changing conditions. Generally, however, it is better to have variety of blood, ways of life, and cultures so that there is more chance of man surviving any disaster.

Is fresh air really fresh?

How many times have you heard someone say, 'I think I'll go out for a breath of fresh air'? Have you ever stopped to think what this means in our industrialized world? Of course, if you happen to be living high up among the mountains where there is little or no industry and few people,your chances of finding fresh air are quite good. But what of the build-up areas of Britain and Europe or America? Even if you have not experienced it yourself, we expect you have heard of *smog*. This word is a mixture of the words 'smoke' and 'fog', which is very apt because smog really is smoky fog. London was once famed for its 'pea-soupers', that is, fog containing so much sulphurous waste that it resembled the yellowish green colour of pea soup and was almost as difficult to breathe and see through. These smogs usually occurred during the early months of winter when the fogs that would normally be present at that time of year became contaminated with all the smoke from cars and factory chimneys.

It is interesting to note how much influence pollution of the air, at first by smells of houselhold waste and later by pollution, has influenced the distribution of people in cities like London. As you probably know, London has an 'East end' and a 'West end'. Until quite recently the East end has been by far the poorer half of the city. This is because winds usually blow from west to east carrying the dirty air with them. People who could afford to choose where they wanted to live went to the western side leaving the smelly east for those with smaller incomes. In Los Angeles, in America, which is also famed for its smogs, the prevailing winds are from east to west so that the London situation is reversed.

Today, many industrial countries have introduced 'Clean Air Acts' preventing the burning of ordinary coal in homes in certain areas and controlling the amount of smoke that factories can release. This means that some areas, such as London, certainly, have air containing much less dust and dirt, and smogs are almost a thing of the past. In general, however, the air in our countries is far from fresh. The millions of cars on the road pour vast quantities of poisonous carbon monoxide gas into the atmosphere. It has even been suggested that if supersonic flight became popular, with the 'planes flying at such high altitudes, the upper atmosphee could be affected in such a way as to permit deadly cosmic rays to reach the Earth.

The next time that you see some plants or trees next to a busy road, take a closer look at the leaves. You will probably find that they are covered with a film of black, oily dust. Remember that this is the same air that we are all breathing.

What does the future have in store for our planet?

This question has many parts to it. We know, for example, that eventually our star, the Sun, will die and in doing so will destroy the Earth. The very distant future, then mens the end of the Earth, but this will not occur for many millions of years and need not concern us here. It has also been suggested that our climate is changing and that we are at the beginning of another Ice Age, but opinion is divided. It is enough to say that large scale changes to the planet as a whole take place so slowly when compared to our short life span that they may go unnoticed, disguised by the much more rapid changes which man is causing to his own life and that of all other living creatures on Earth.

The usual way of attempting to 'see' into the future is to look at the way changes have occurred in the past up to the present day and then try to project into the future, but this is not easy because it is not always possible to anticipate the effects of a particulars set of circumstances. Try a simple experiment. Draw two lines on a piece of paper at right angles to one another to form the axes of graph. The graph could represent, say, the rate at which a hot water bottle cooled after it was placed in your bed. Suppose one axis represented temperature and the other time. Suppose also that you had measured the temperature on two occasions so that you could plot two points on your graph. These could be joined by a straight line, and if you wanted to know the temperature of the bottle simetime later, you would simply project that straight line to the required point in time. But if, in the meantime, someone removed the blankets from the bed, the bottle would cool much more quickly and your prediction would be wrong.

The subject of many science fiction stories deals with ideas of what conditions might be like in years to come. Some suggestions seem to be wildly far fetched, but a hundred years ago who would have believed in the possibility of supersonic flight or submarines that can stay under the Arctic ice for two years without surfacing, or even in satellites circling Venus? On the other hand in the heyday of the motor car a few years ago, most of us would have laughed at the idea of fuel shortage. How do we know what the world's population might be in a hundred or even twenty years time? Can we predict whether science and technology will be able to find solutions to the problems of overcrowding, food shortage, and pollution choking our rivers and seas, or the ever-decreasing numbers of wild animals and plants with the accompanying dangers to our own species. Will we be able to take a rocket to a distant planet as easily as we can now take a bus to the next town, or will we return to more rural living, each community growing its own food and making clothes by hand? Then there are the dangers of nuclear war. If man is to survive in peace and plenty, the watchword seems to be to try to foresee the consequences of any action rather than wait and see, by which time it may be too late.

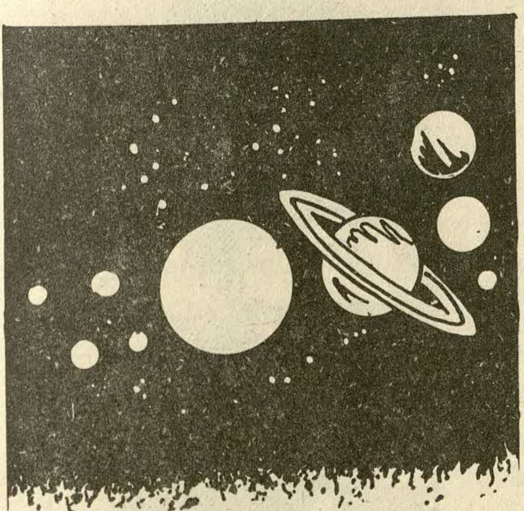
ASTRONOMY

What's the Difference between a Star and a Planet?

A star is a huge ball of hot, glowing gases, which whirls in space. All stars are made up of the same two gases, hydrogen and helium, and they shine by their own light, which is produced as a result of atomic reactions in their centre, causing great heat.

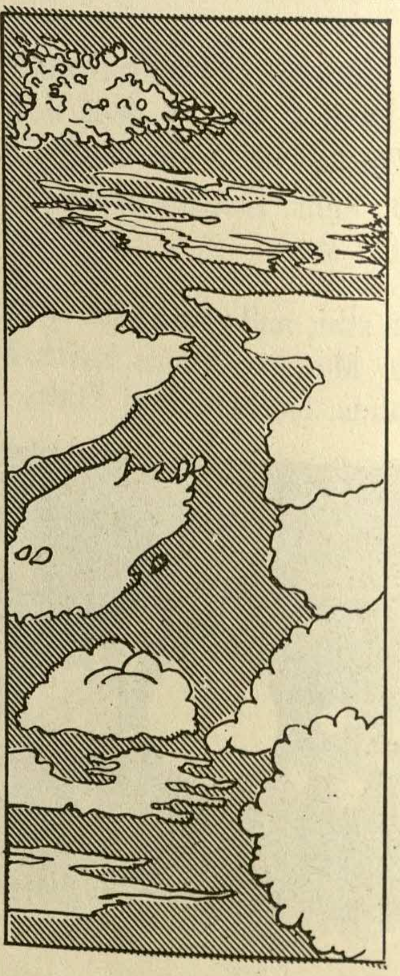
Planets are different. A planet is much smaller and more solid than a star. It does not shine by its own light, because it is not nearly hot enough to produce that light. Instead, it shines by the light of the nearest star.

Our sun is a star, and in its solar system there are nine planets - Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune and Pluto.



How are clouds formed?

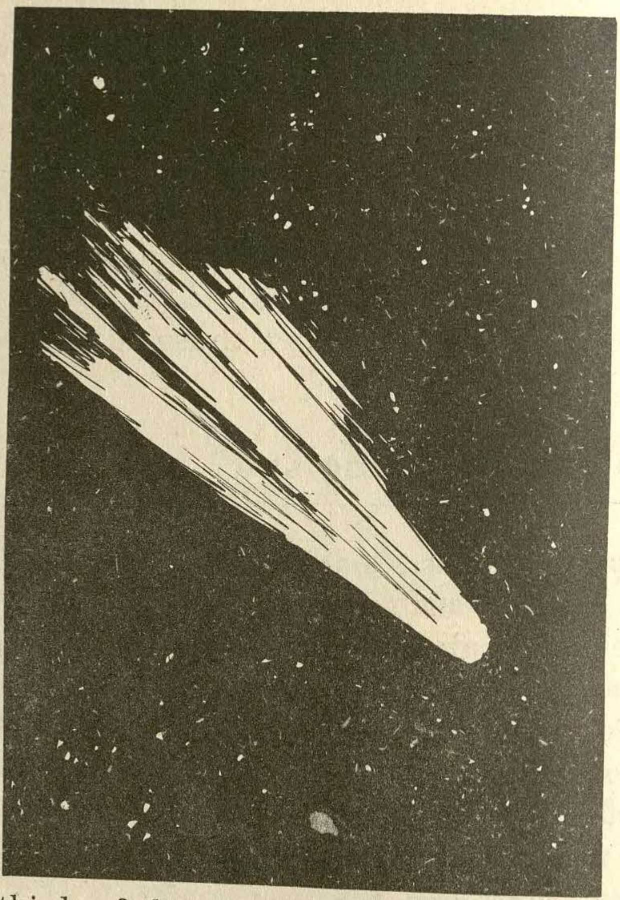
Clouds are formed when warm moist air rises into the sky. When it reaches a certain height, the warm air cools down and the water vapour in it condenses into small drops of water, forming clouds. There are several different types of cloud. The ones which are highest are usually made up of drops of ice, and are the thinnest. These are called *cirrostratus*



and *cirrocumulus* clouds. Lower clouds are called *altostratus* and *altocumulus* clouds. Lower still are the *stratocumulus* clouds and the *nimbostratus* clouds - these are the thick and shapeless rain clouds - and the lowest of all are the *stratus* clouds, which are seen as fog over high, mountains regions. Thunder clouds are called *cumulus* and *cumulonimbus* clouds, and these are the fat, cauliflower shaped ones.

What is a shooting star?

In fact, shooting stars are not stars at all. We call them meteors, and scientists believe that they are broken fragments of comets, which still move about in space when the comet itself does so no longer. We see them when they enter our atmosphere because they leave a trail of light behind them, caused by the friction of the air on their surfaces. Most meteors are very small, but some can weigh several tons, and the vast majority of them disintegrate when they pass through the heat of the earth's atmosphere. But some meteors, the larger ones, do land on earth, and when they do we call them meteorites. There are two main types of meteor - those made of minerals, which look like rock and are called *aerolites,* and those made chiefly of nickle and iron, which we call *metallic* meteors. Although it is very rare for a meteorite to fall on dry land, scientists think that many fall to earth every day, but that they land in the water which makes up



two thirds of the earth's surface. This is why we hardly ever notice when they do hit the earth.

When will the Earth die?

As you have already seen, the very existence of the Earth, and all the other planets in the solar system, depends upon the Sun. You have seen how the Sun provides enormous amounts of energy by the change of the gas hydrogen into the gas helium. But as with any other 'engine' the fuel, that is the hydrogen, must slowly be used up. When this happens, as has already occurred with millions of other stars, the Sun will collapse and explode. The explosion will totally destroy the Earth and its neighbours. There is no need to worry unnecessarily - it will be at least another 5000 million years before the Sun explodes.

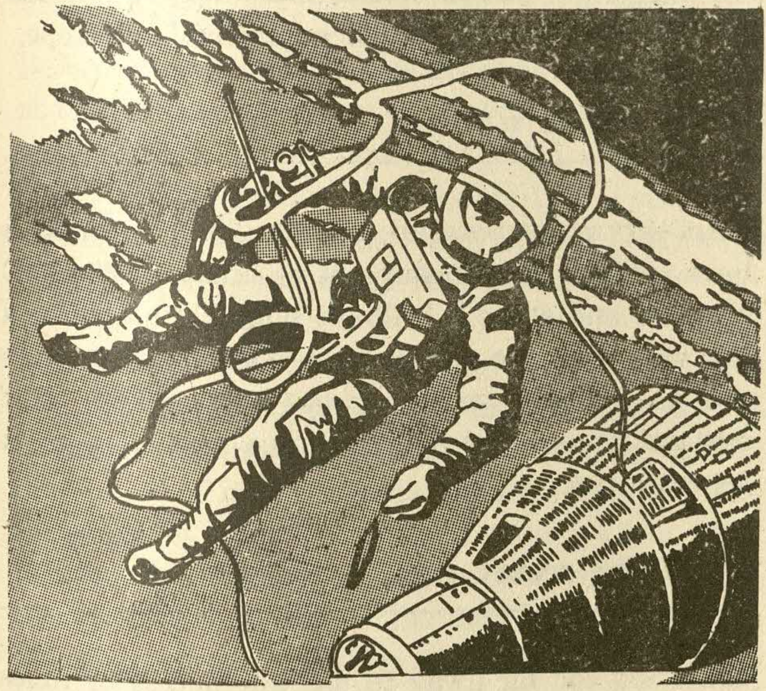
Is there life on other planets?

Ever since man has been aware of worlds beyond our own, he has begun to wonder whether he is alone in the Universe. Do other races of creatures very different or perhaps quite similar to ourselves exist on distant planets? This desire to explore beyond the confines of our world and to imagine what possible life forms could exist on other planets has let science fiction writers to describe all kinds of strange creatures. In *The First men on the Moon,* H.G. Wells tells of a species living in the craters and caves of the Moon that he calls the Selenites. These creatures resemble giant, intelligent ants. Of course, we are aware today that no such creatures exist and there never has been any form of life on the Moon, least of all the 'Man in the Moon'. There have been other creatures from the pages of science fiction such as the Mekons with tiny green bodies and huge heads whom Dan Dare met in his space travels in the *Eagle* comic. More recently, television has brought the terrifying, war-like Daleks who confronted Doctor Who in the programme of the same name.

These are just a few of the imaginary men from outer space, but what are the possibilities of actual life forms? The first point to make is that there is little to be gained from trying to picture weird and wonderful creatures sprouting radio antennae from their heads and breathing liquid ammonia. We should try to confine ourselves to examining whether or not there is any chance of living systems much like our own somewhere else in the Universe. It must also be remembered, however, that a living world elsewhere could be more or less developed than our own. In other words it could still be at the stage of a 'primordial soup' of primitive life forms or thousands of years more advanced than our own world.

Scientists have attempted to calculate how many galaxies there are in the Universe and how many solar systems are contained within these galaxies in a effort to work out how many planets there might be similar to our own. Even the most cautious would probably agree that the number of planets in the Universe similar to our own probably runs into the thousands. This means that the chances are heavily in favour of there being many other worlds just like our own in which there are plants and animals and humans breathing air made of oxygen, nitrogen, carbon dioxide, and a few others gases.

Are these intellegent creatures trying to make contact with us using radio waves? Some people think so, but of course, they may be thousands of light years away so that by the time we received any message, they could be extinct. The possibility exists that we have already been visited by spacemen and that such wonders of the world as the pyramids of Egypt were constructed with their help. Perhaps soon we shall know more of the creatures from outer space.



How many stars are there?

If you look up into a clear night sky in the heart of country well away from town light, you will be able to see about 2,000 stars. In the entire sky, there are between 5,000 and 6,000 start visible to the naked eye. But there are millions upon millions of stars to be seen through a powerful telescope.

How hot is a star?

Stars vary in temperature greatly. The hottest stars have surface temperatures of as much as 35,000°C or more and shine a brilliant blue-white. The less hot stars are, the redder they appear to be. Stars are classed into various groups according to their surface temperature. The sun is in a group of medium temperature.

How far away are the stars?

Stars are too far away to use kilometres or miles to measure their distances, so astronomers use light-years instead. One light-year is nearly 10 million million km, and the nearest star, Proxima Centauri, is 4.25 light-years distant. The farthest heavenly bodies are at the unimaginahble distance of 8,000 million light-years! As the earth moves around the sun, the nearer stars appear to move very slightly in relation to the distant stars. The farther apart they are, the greater the parallax (apparent movement) appears to be. By observing the various movements, astronomers are able to calculate the approximate distances of the stars from earth.

Does a comet foretell disaster?

Before we can answer this question, we must look at exactly what a comet is. As you probably know, a comet looks rather like a star with a long, milky 'tail' stretching across the sky. In fact these 'tails' are not tails at all because they always point away from the Sun and do not trail behind.

A comet seems to be made up of three main parts. The *nucleus* in the centre of the star-like part is composed mainly of ice and dust particles, surrounded by a *coma* of much smaller particles and gas. The coma results from the melting of the ice and other substances as the comet approaches the Sun on its extremely stretched out elliptical orbit. The Sun's radiation also tends to force some of these tiny peices of ice away from the comet and out into space, which explains why the tail is always directed away from the Sun.

A scientist called Halley, after whom a particulary bright comet is named, discovered how comets moved. He also predicted when some comets which had already been seen would return. For example, Halley's comet made its closest approach to Earth for 76 years as predicted in 1986.

Why are comets associated with disaster? It is true that a comet appeared before the Norman conquest of Britain in 1066, and that two more comets were seen before the Great Fire of London in 1666 and the Great Plague in the previous year, but in world terms these cannot be regarded as major events. Perhaps it is the result of people's belief that what happens in their own country is of world importance that has led to this idea that comets predict disaster. On the other hand, it has been suggested that the Star of Bethlehem that told of the birth of Christ was in fact a comet. It does seem unlikely, however, that a body of ice and gas moving around the sky in a quite regular orbit can have anything to do with the events here on Earth. This is particularly true of comets because they have such a low density. Although they may have a diameter of as much as 128,000 kilometres they do not have enough gravitational pull to affect the bodies they pass. In fact, their own orbits may be completely changed.

Why are stars grouped in constellations?

People who gazed at the skies in ancient times believed that they could see the shapes of animals and peoples traced out in the stars. These star groups, or constellations, have the Latin names of the shapes, and astronomers use the names in identifying stars. But the stars in a constellation do not belong to any actual group in space and may be far apart. The twelve constellations lying on the ecliptic, the sun's path through the sky, are called the zodiac.

What is a nebula?

One of the most striking objects in the sky is the Great Nebula in the constellation of Orion. It can be seen as a faint greenish patch with the naked eye just below Orion's Belt, but through binoculars or a telescope it is seen as a mass of glowing gas. Nebulae are large clouds of dust and gas in space. Many produce their own light, and others are illuminated by stars. Some are dark, and we see them as black clouds or bands against the stars. Many luminescent nebulae are formed when stars explode into supernovae. The remains of the star move out through space as an expanding shell of glowing gas. Nebulae are among the most striking sights in the heavens. Photographs show them to have beautiful colours, but these colours may not show in a telescope.

Where and what are the galaxies?

Our galaxy, vast island of stars though it is, is only one of millions of similar galaxies scattered throughout space as far away as we can see through our telescopes. The nearest galaxies to our galaxy are two small satellite galaxies called the Magellanic Clouds. They can be seen only in the southern hemisphere, and look like pieces torn out of the

Milky Way. A large nearby galaxy is the Andromeda galaxy, which can be seen with the naked eye as a faint patch. It is over 2 million light - years away.

Galaxies come in many shapes. Many are spiral. Elliptical galaxies look like globular clusters of stars, and irregular galaxies such as the Magellanic Clouds have no particular structure. About a hundred million galaxies can be seen with the largest telescopes. Galaxies, like stars, tend to form clusters and our galaxy is one of a cluster of over twenty that include the Andromeda galaxy.

What are quasars?

The word quasar is short for quasi-stellar object, which means an object that resembles a star. But quasars are not like ordinary stars. Many are thought to be near the edge of the observable universe and moving away from us at nearly the speed of light. But quasars produce intense amounts of light and radio waves, and may be as much as 200 times as bright as an ordinary galaxy. And they appear to be much smaller than a galaxy-about one light-year across. No one can account for how quasars produce such immense amounts of energy. Perhaps they are much nearer, much larger, and not moving so fast.

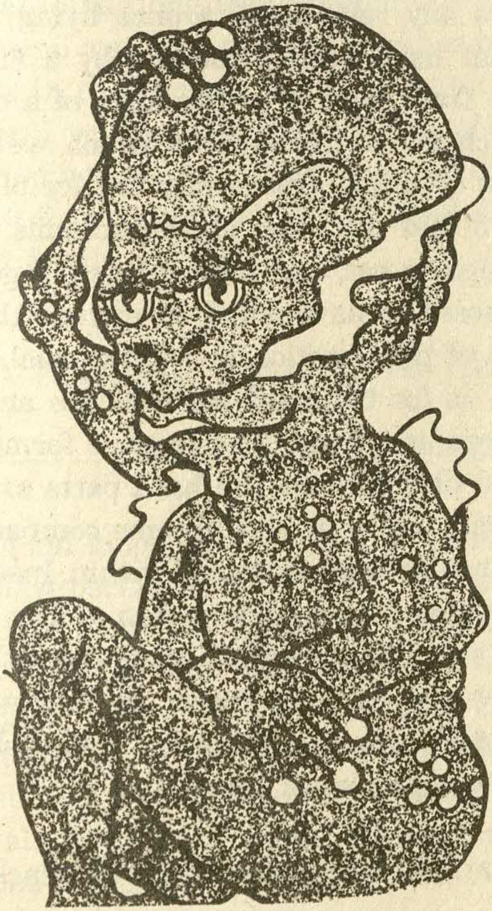
Why doesn't the sun shine at night?

Well, as a matter of fact the sun *is* shining at night, but we can't see it. The Earth, which is rotating in space, turns completely round once every twenty-four hours. In the course of this rotation each part of the globe will be facing the sun for a certain amount of time. It is this time which we call 'day'. When the part of the globe where we live is facing away from the sun, and we cannot see its light, we call the time 'night'. So, when it is day for you, it is night for many other people, far away in other lands.

EVOLUTION

Is there life on other planets?

Not on any other planet in our solar system - the other planets are either too hot or too cold to support life as we know it. The only other planet which it was thought might possibly have had life on it was Mars, but recent space voyages have discovered that its atmosphere was not suitable to support life. However, when you consider all the other solar systems in the universe, where man has not yet



explored, it seems very unlikely that no other planet has some form of life on it. Many people imagine aliens to be the same basic shape as humans, but this need not necessarily be the case, and that does not mean that they would necessarily look hideous. After all, aliens might be absolutely horrified by our shape, if they had never seen it before.

What is a fossil?

Fossils are any remains of a once living plant or animal that have been preserved by a variety of ways. The trace may be in the form of a complete animal such as the mammoths which were found by Russian scientists frozen into the ice of Siberia. . It was said that the meat on the animals was still fresh enough to eat, and indeed Russian geologists were supposed to have dined on mommoth steaks. This form of preservation is very ususual. A more likely way is for the hard parts of the animal to be preserved as a fossil. The fossil is formed when the animal dies because the hard parts are buried by sediments which in turn become compacted into rock, leaving the fossil contained within. Insects have commonly been found preserved in amber which is fossil tree sap. The sap probably ran down the trunk of the tree trapping the insect so that when the sap hardened into the beautiful yellowish brown amber it was preserved complete.

Plants may be found preserved as black traces, particularly in rocks called shales. You may find traces of leaves and stems in this way. More recently it has been discovered that the pollen which all flowering plants release for fertilizing their seeds has been preserved in quite large amounts. In fact, the science of palynology as it is called, has become very important in the search for oil.

Animal trails may also become fossils. Trails of worms moving along the sea bed have been found which have become 'frozen' into what has become a rock. Footprints of the long dead dinosaurs are not ususual. In the same way that modern chickens eat grit and retain it in their crops to aid digestion, dinosaurs swallowed quite large stones and they can be recognized by scientists called *palaeontologists,* who study all forms of life in former geological periods through fossils.

Which fossils are you most likely to find?

The animal kingdom is divided into those animals which have backbones, *vertebrates,* and those animals which do not have backbones, *invertebrates.* In terms of the numbers of animals which have ever lived throughout the history of the Earth, the invertebrates are much more common. Many invertebrates had external shells made of chalk-like materials to protect them. Others had internal skeletons made of similar substances.

Therefore, you are most likely to find fossile of animals which were numerically common, widely distributed, possessed hard parts, and which lived in conditions suitable for their preservation. In other words you are most likely to find fossil invertebrates.

What was the first life on Earth?

Until quite recently it was thought that there were no abundant life forms on this planet until about 600 million years ago. When we remember that the Earth itself is at least 4500 million years old, it does seem to have taken a very long time before any animals or plants appeared. Then, geologically speaking, they must have developed very quickly indeed. Probably the reason why 600 million years was thought to be the date of the earliest common life was because a great deal of pioneer work in geology in the 1800s was done in Britain. Apart from the some recently discovered traces in older rocks of Scotland and charnwood Forest, England, the oldest fossils occur in rocks dating from a period called the Cambrian found first in Wales and then in Scotland. In these rocks fossils of shellfish called brachiopods, insect-like, sea-dwelling trilobites, cockle-like shellfish, and one or two other groups of animals are all to be found in abundance.

It was obvious, however, from the work of many geologists that these Cambrian rocks were not the oldest in Britain. Unfortunately almost all the earlier beds had been severely altered by heat and pressure as a result of earth movements so that even if there were any traces of life they would have been lucky to survive for the workers of the last century to find. All these older rocks were lumped together, and the period in which they were deposited was called the Precambrian.

Of course, if many different types of animals had developed by the Cambrian period, it seems reasonable to suppose that they could not all have suddenly arrived on the scene. This suggested that although few traces had been definitely identified as belonging to more primitive life, there must have been some early life forms developing slowly during the millions of years of the Precambrian.

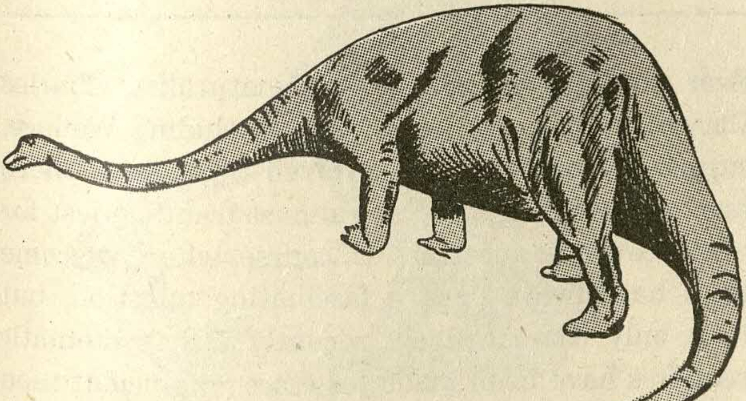
Later more and more people in countries outside Britain became interested in the geology of their own countries and it was not long before traces of very primitive worms, sponges and other very early invertebrates were found in Precambrian rocks of North America, Australia, and southern Africa. In 1964, a scientist called J.G. Ramsay claimed to have found structures which resemble the algae you might find in a pond, in a series of rocks which have been dated at 3500 million years old. In fact, associations of algae and other life forms, called stromatolites, are the most wide-spread Precambrian fossils. You can see then that the fossils which you may be able to find quite easily on beaches or in chalk quarries are very old by our standards but new-comers by the standards of Earth's time.

Which animals are among the largest that have ever lived?

It is probably safe to say that some of the largest animals that have ever lived on the surface of this planet are members of a group of animals which have been collectively called dinosaurs. These 'terrible reptiles', as their name means, have excited the imagination of men ever since bones of the first dinosaurs were discovered in rocks of Upper Triassic age - that is, deposits about 200 million years old. Many tales have been told of these monsters sharing the Earth with man, but, of course, all the dinosaurs had died long before man appeared.

Dinosaurs evolved into a great variety of different shapes and sizes but they all had a common ancestor. They ranged in size from dinosaurs the size of a chicken, to other which were as much as 30 metres long and weighing more than 30 tonnes. Some dinosaurs, such as *Diplodocus*, lived on plants. Others were hunters. They attacked and killed dinosaurs as much as 15 metres long for food. *Tyrannosaurus* were the largest meat-eating animals that have ever dwelled on land. Bones of these animals have been discovered in rocks about 70 million years old in North America. There were also dinosaurs that lived in the sea. Others such as *pteranodon* developed a kind of wing and they could glide in the upward current of air that occur above the cliffs on which they must have lived.

Some of the less terrible dinosaurs could escape the predatory ones using their speed, but others were much too clumsy and slow-moving to get away. They developed armoured covering to their bodies to protect them and had spines and horny plates as well. In fact, *Stegosaurus* was probably able to defend itself quite well with the help of spikes at the end of its long tail.



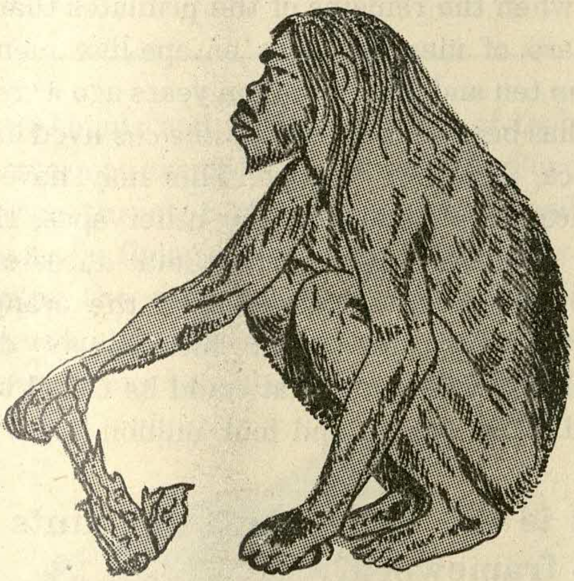
Dinosaaurs have presented researchers with many puzzles, not least of which is how giants like Brontosaurus managed to live at all. Examination of its bones has shown that its legs were probably not strong enough to support its weight on land, and if it lived partly submerged in water, its rib cage may have collapsed. On the other hand, it did not possess the correct kind of feet to survive in swamps.

There have been many arguments about why the dinosaurs suddenly died out. Perhaps the climate changed. In the 1980s, scientists found evidence of a disaster about 65 million year ago. It may have been caused by the impact a huge meteorite, which threw up dense clouds of dust around the Earth.

How long has man been walking the Earth?

Ever since the philosopher and naturalist, Charles Darwin, and his contemporaries including Wallace, suggested that man had evolved from apes, there has been a continuous, and almost frantic quest for evidence of our ancestors. Of course, where we come from has always been a fascinating question, but it is only comparatively recently that systematic searches have been made for traces of ancient men by such eminent scientists as L.S.B. Leakey and still more recently by his son, Richard. As you might imagine, the idea that man came from monkeys brought with it a great deal of public outcry, and in fact, modern research has shown that man did not descend directly from apes but that the apes and man evolved from a common ancestor.

As you know the first thing that monkeys, apes, and man have in common is that they all have backbones, so that they are all vertebrates. Many characteristics in man have arisen from living in trees. We share them with other primates, as monkeys, apes and man are known. If yoiu suddenly found that you had to live in a tree, what do you think the most useful adaptations would be? There would bot be much point in having hoofs like a horse which help the horse to run fast. You would



need to be able to hold on to the branches, however, as our hands are well able to do. If you wanted to jump from branch to branch, you would have to be able to judge distances. You would need stereoscopic vision, that is, two eyes positioned at the front of your head, not at the sides as in a fish. You are unable to smell the traces of scent that a dog can, but you do have a much enlarged brain. It is the growth of the brain that has enabled man to leave the comparative safety of the trees and compete with the other ground-dwelling animals that are stronger, have better hearing and sense of smell, can run faster and have warm coats to protect them from the extremes of climate.

As you might expect, because man and apes have developed from a common ancestor, it is not easy to tell when the remains of the primates that have found are of men-like apes or ape-like men. But between ten and fifteen million years ago a creature which has been called a *Ramapithe-cus* lived in parts of Africa, Asia, and Europe. This may have been the ancestor of man and the other apes, though recent evidence suggests that our ancestor was another creature, the ancestor of the orangutan. However, the groups became increasingly diverse until the first creature that could be called human arrived. This was around four million years ago.

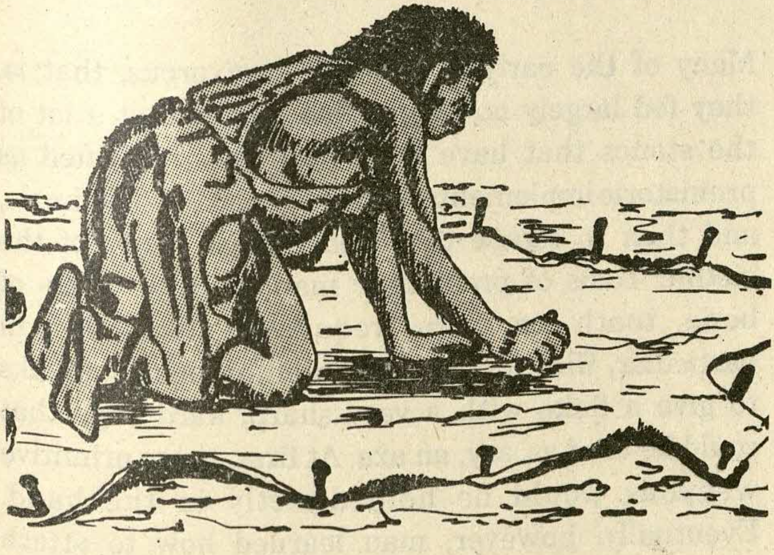
What is the importance of plants in life's framework?

It is only when we stop to think that we realize the importance of land plants to us. We eat them in our cereals and vegetables, we make use of them for fibres like cotton, we depend on them for many drugs such as penicillin. But even when we eat meat, we must remember that the animals which produce the meat probably lived on plants.

Plants are nature's producers. From sunlight, oxygen, and other foods from the soil, plants manufacture the foods upon which all animals ultimately depend. It is worth noting that it was with the rise of land plants in the Devonian, that land animals also began to evolve.

What kinds of tools did early man use?

Some animals and birds make use of tools. There are some good example among the birds. For example, the song thrush commonly feeds on snails which it opens by flying up with the shell in its bill and dropping the snail on convenient stone. The bird often uses the same stone on a number of occasions so that it may become littered with broken shells.



The stone is often referred to as a thrush's anvil. The members of the shrike family often make use of thorns on which they impale their prey. But man more than any other animal has taken advantage of his large brain capacity to increase his power to hunt, kill, build his homes, and so on.

It is man's ability to hold things in his hand which has enabled him to make such use of tools, where other animals have had to rely on their strength and agility, their teeth and their claws. Man's first tools and weapons were stones which he had picked up. He chose stones that had been worn and sharpened by the weather into shapes that could be used as clubs or for cutting and scraping. As you might imagine the right shaped stones were not always easy to find, so that in time man learned to fashion primitive tools to a constant design that suited his purpose.

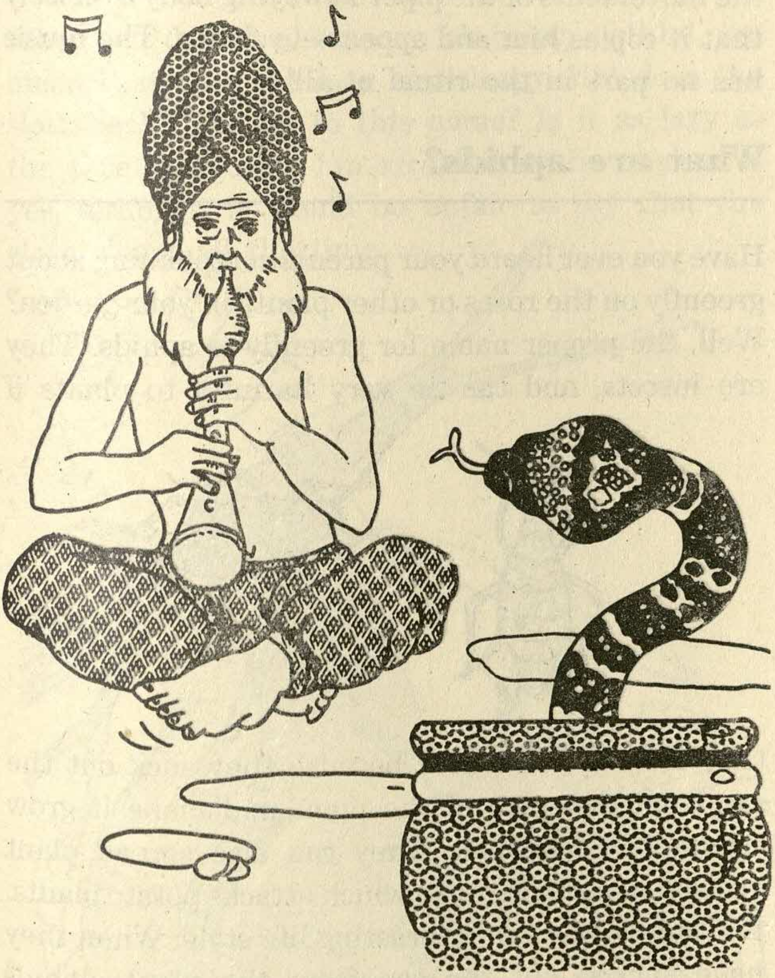
Many of the early men were carnivorous, that is, they fed largely on meat. This meant that a lot of the stones that have been positively identified as prehistoric implements were designed to kill animals, and then to scrape the flesh off the bones of the victim. Tools of prehistoric man could be made of bone, tooth, or more frequently stone, and in particular, flint. Flint was chosen because it breaks to give a flake with a very sharp, hard edge that could be used as, say, an axe. At first, these primitive weapons would be held directly in the hand. Eventually, however, man learned how to attach these axe-heads to a wooden shaft, and the power of the weapon was increased.

As he became more experienced in making stone tools, the tools became more and more advanced in their design so that soon he was making blades, scrapers, and even arrowheads. Arrowheads were a great advance because they meant that for the first time man could kill his prey without putting himself to the risk of approaching what could be a very dangerous animal. Of course, these weapons could also be used to wound and kill other men.

ANIMALS

How are snakes charmed?

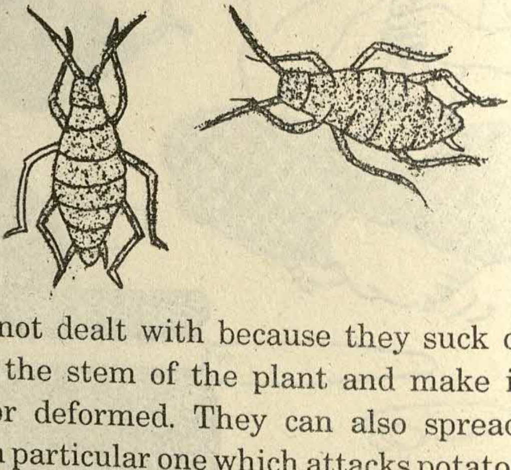
There is a lot of misunderstanding about this, and most of it is deliberately caused. Snake charmers would like us to believe that the snake is bewitched



by the beautiful music they play on their pipes. The snake sways and dances to the music while the charmer taps his foot on the ground in time with the rhythm - and it is this tapping which solves the mystery. A snake is tone deaf; it cannot hear music, so in fact it doesn't respond to the sound of the pipe at all, but it *does* feel the tapping of the charmer's foot on the ground, and it watches the movements of the piper's swaying body so closely that it copies him and appears to dance. The music has no part in the ritual at all!

What are aphids?

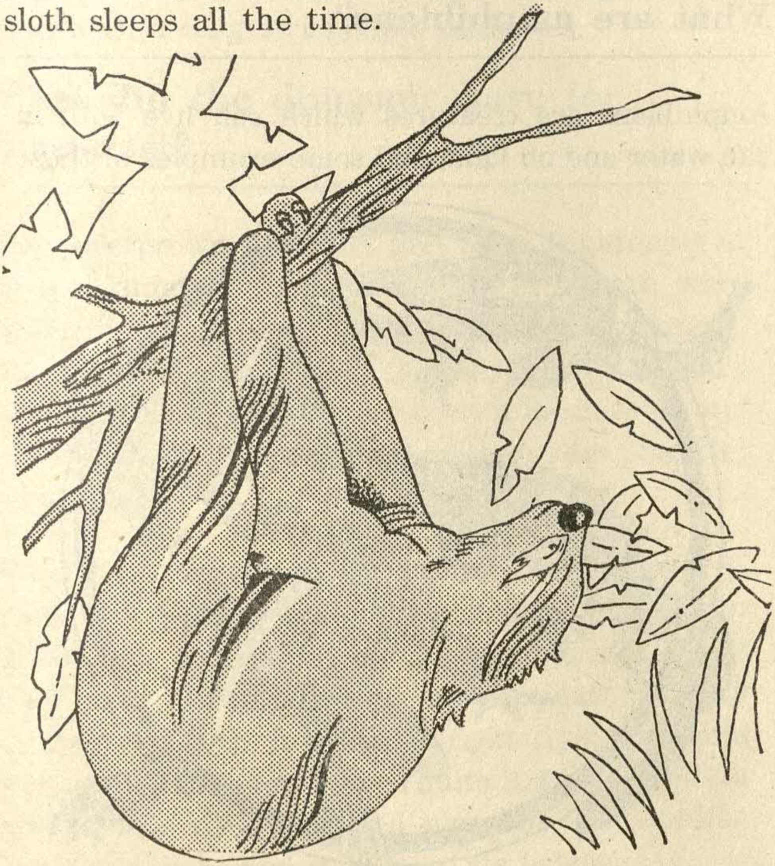
Have you ever heard your parents complaining about greenfly on the roses or other plants in your garden? Well, the proper name for greenfly is aphids. They are insects, and can be very harmful to plants if they are not dealt with because they suck out the sap from the stem of the plant and make it grow stunted or deformed. They can also spread plant viruses, in particular one which attacks potato plants. But aphids have an interesting life style. When they have sucked out the sap from the plant, aphids secrete a sweet liquid called honeydew, which ants love. In fact, so fond are the ants of this honeydew that they keep herds of aphids near them, and they



stroke the aphids' sides to encourage them to secrete the honeydew. A strange case of dairy farming in the insect world, isn't it?

Do sloths sleep all the time?

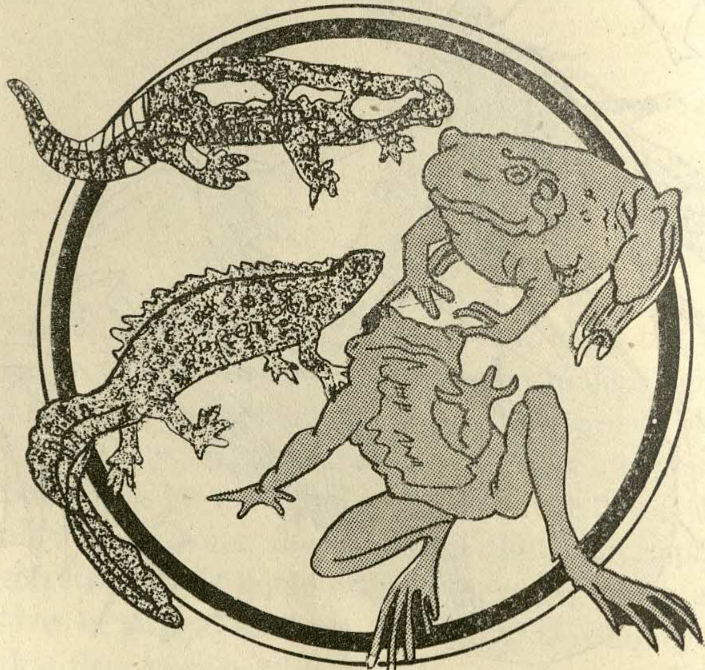
When we describe someone as being slothful, we mean that they are lazy and sleepy. But does the sloth really live up to this name? Is it as lazy as the term suggests? I'm afraid that the answer is yes, although it would be unfair to say that the sloth sleeps all the time.



The main characteristic of sloth is that it does everything very, very slowly. In fact, it looks as if it is on film which has been slowed down until it has almost stopped. For example, the sloth moves about at less than half the speed of a human being walking slowly. And it does do an awful lot of sleeping! Out of every twenty-four hours, a sloth sleeps for nineteen. So idle is it that algae, greenish brown slimy plants, grows in its fur. Not a very endearing animal, is it?

What are amphibians?

Amphibians are creatures which can live both in the water and on land, and some examples of these



are newts and salamanders, frogs and toads. In water, the amphibians can both walk and swim, but they tend to move quite slowly on land unless, like frogs, they can jump. Their skin is soft and damp, unlike snakes whose skin is dry and scaly, and they mostly have lungs instead of gills. To a certain extent, though, they can breathe through their skins, and some amphibians do have gills. Amphibians lays eggs - everyone has seen frog spawn, a blob of transparent, jelly-like balls with a black speck in the middle of each ball which will later become the tadpole. Toad spawn is in long strings like necklaces.

What did the dinosaur have for breakfast?

The 'overgrown lizard' is that most frightening of extinct animals. *Tyrannosaurus rex*. There were some dinosaurs even larger than *Tyrannosaurus*, but they were harmless, placid, grazing animals. *Tyrannosaurus* was a carnivore - a meat eater and its breakfast was probably another, less powerful dinosaur.

Thanks of fossil remains, we have a good idea of what this monster looked like. It stood nearly 7 m (23ft) high to the top of its horny head, and its great jaws were lined with curved teeth up to 15 cm (6in) in length. It walked upright (as some lizards do now) and probably moved quite fast, rocking from side to side as it pounded along on its claw-like feet.The tail helped it to keep its balance.

Did dragons ever exist?

Dragons have always been very popular subjects for folklore and legends. There are friendly dragons, but most of them are very hostile and likely to kill on sight with a burst of flames from their nose or mouth. Almost every hero in folklore has killed a dragon at some point in his career, as well as all the other daring feats he is supposed to have performed. But what are dragons, and did they ever exist at all?

The answer is probably that the first stories of dragons sprang out of the discovery by ancient man of the huge fossilised bones of the dinosaurs. These men realised that the bones belonged to enormous lizards, and indeed if you look at old pictures of dragons they look very much like dinosaurs as we know them to have been. No one knows the origin of the tales about fire breathing. It was probably added to make the hero's courage in killing the dragon seem even greater, although anyone who had the courage to approach a dragon like that, let alone kill it, would have been brave enough.

Why do birds migrate?

Not all birds migrate, but a lot of them do, two of the best known British migrating birds being the swallow and the house martin, which fly south in the autumn to spend the winter in parts of Africa. The reason they do this is because of the need for food, of which there is a great shortage in northern Europe during the winter - these birds eat mainly insects which die or hibernate in winter.

So why doesn't the swallow stay in Africa all year round? The reason is that it breeds in Europe rather than in Africa. This is also the case when fish such as salmon travel each year to places where they feed.

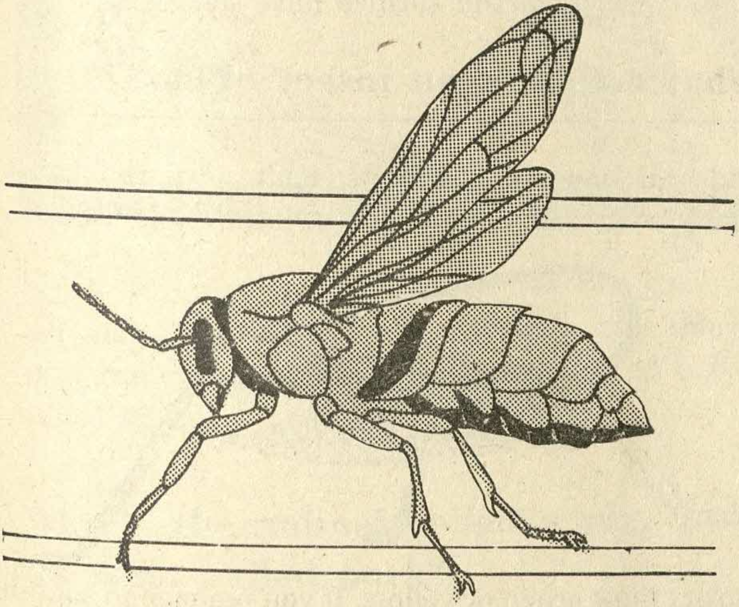
It isn't only European birds which fly south. North American birds fly south in the winter too. In the southern hemisphere, when winter takes place at the same time as European summer, Australian birds fly to places like Malaysia to escape the winter. They are there from April to September, and between

October and March Malaysia sees northern hemisphere birds like cuckoos and plovers arriving to spend the European winter months there too.

So Malaysia has regular colony of foreign birds at all times of the year. It makes you wonder what happens to all the native birds of Malaysia when all these visitors arrive, doesn't it? They must never have the place to themselves!

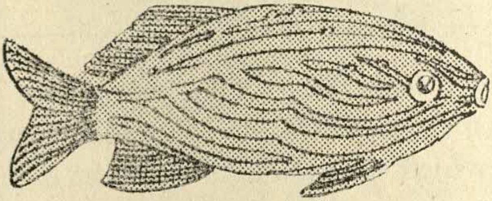
How do insects breathe?

Insects don't have lungs like you or me. Instead they have a tube system, which runs all over their body, and which carries air to all parts of the body. These tubes are called *trachea*. The air is carried to the body when the movement of the insect's muscles pumps it there through openings in the insect's skin.



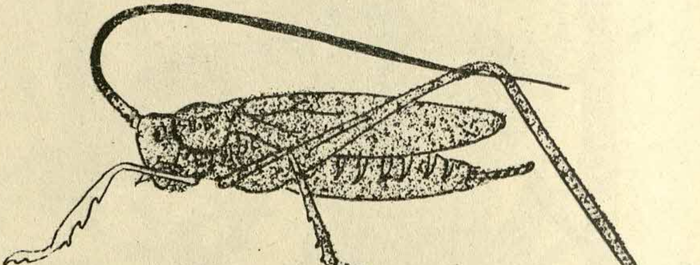
Do fish sing?

Well, it's not exactly singing, but some fish can make musical sounds. The siren fish of the Mediterranean can make a tuneful noise by grating its teeth together, and the drumfish is so called because it can make a noise like a drum, so loud that fishermen sixty feet above it on the surface have heard it.



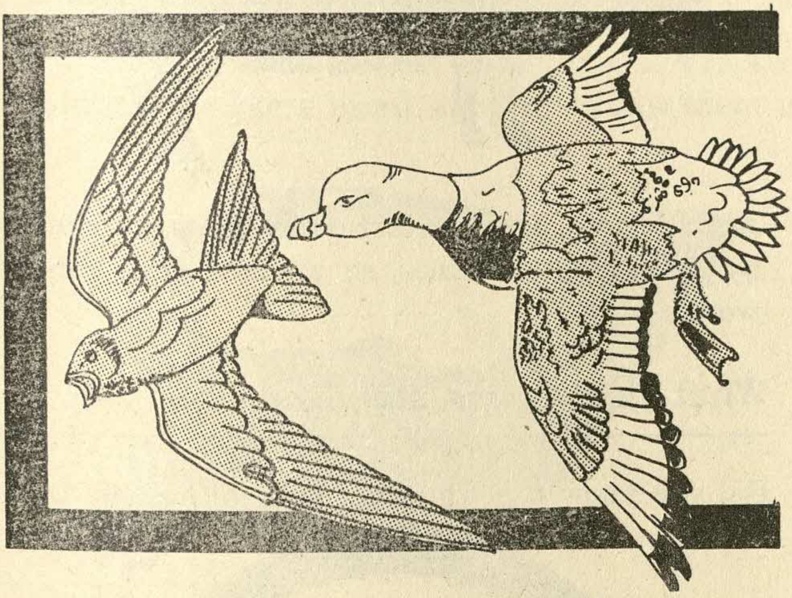
What colour is an insect's blood?

Did you know that insects don't have red blood like us? Instead their blood is either colourless or a very faint green or yellow. If you manage to squash an insect, and you see red blood, you can be sure that that red has come from the blood of some animal the insect has bitten.



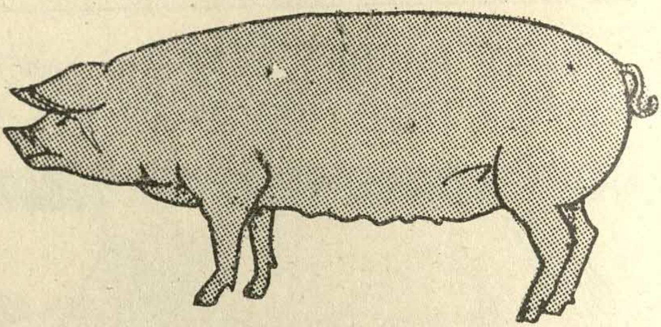
How fast can birds fly?

Quite amazingly fast! Even the common sparrow can reach fifty miles an hour, and the duck can reach seventy. But the speed records goes, not surprisingly, to the aptly named swift. This amazing bird can reach speeds of over a hundred and six miles an hour!



Why is the animal called a pig, and its meat called pork?

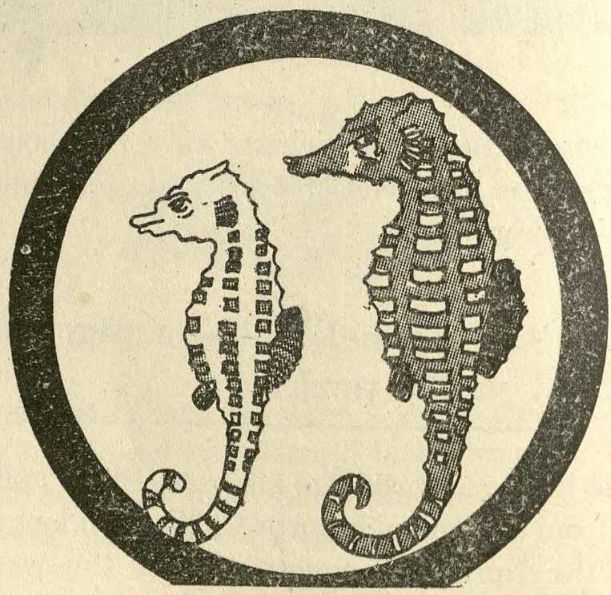
This is because words like pig, cow, sheep and calf come from the Anglo-Saxon or Old English language. After the Norman conquest in 1066 the wealthy French-speaking landowners called these animals by their French names when they ate them, giving us the words pork, beef, mutton and veal. The



Anglo-Saxons, however, carried on calling the animals by their original names, so we have both sets of words.

What fish swims standing up?

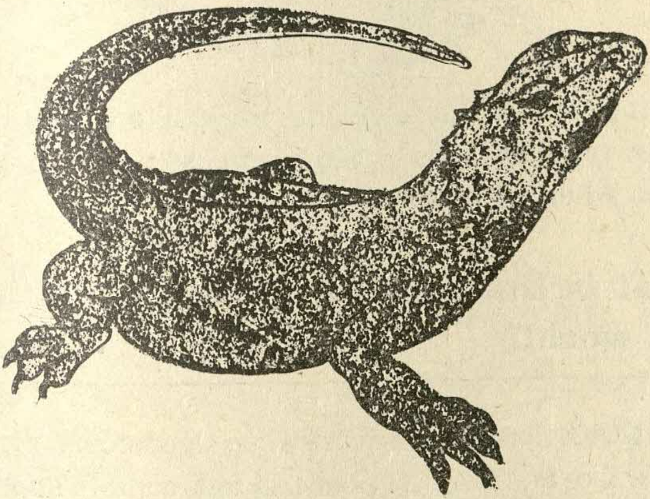
Did you know that the sea horse is the only true



fish which swims in a standing up position, and not lying down as other fish do?

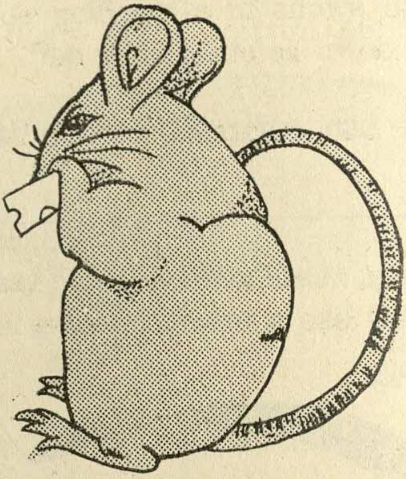
Is there an animal which has three eyes?

Surprisingly, there is. This is the tuatara, a reptile which looks like a lizard. In some lizards there is a gland at the front of the brain called a *pineal* body, shaped like an eye. In most of these lizards, the pineal body is not fully developed, and does nothing at all, but in the tuatara's case, it is developed fully, and acts as a third eye.



Do mice really like cheese best?

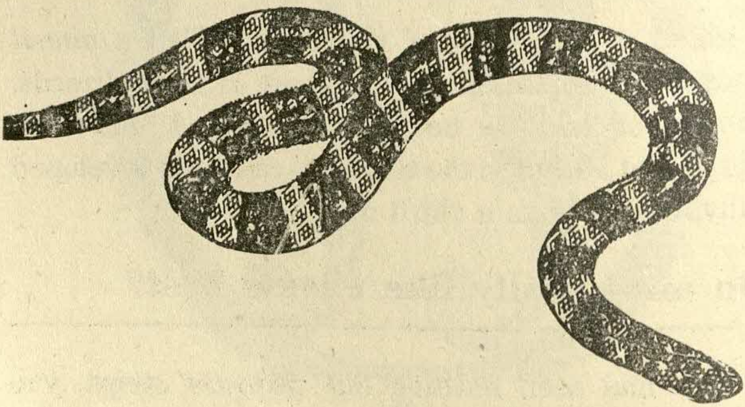
If you had seen nothing but cartoons strips, you



might think so. But in reality, mice, like all rodents, prefer vegetables and grain to cheese, and will only eat it when they are very hungry.

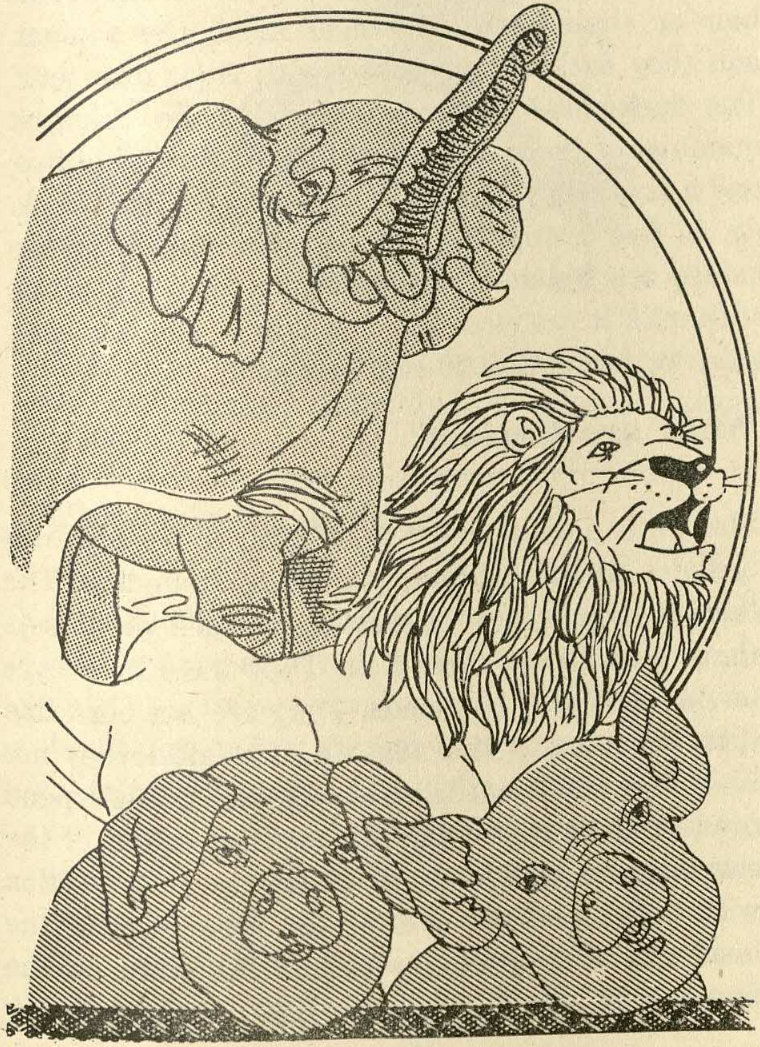
What is the most poisonous snake in the world?

This title belongs to the Australian tiger snake, which is only five feet long. Its poison glands contain enough venom to kill three hundred sheep!



What is a mammal?

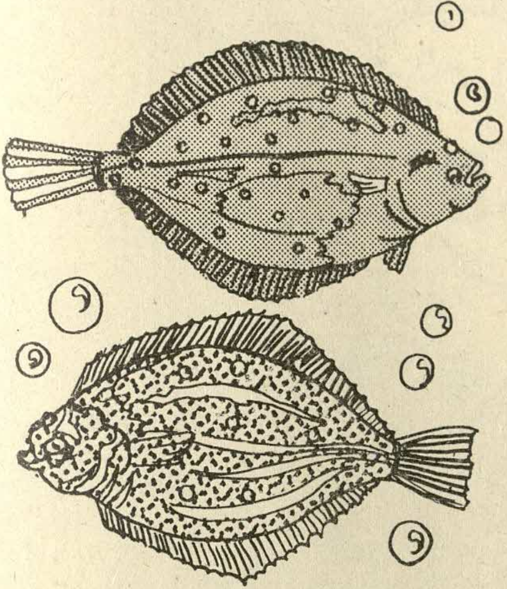
People are mammals, and so are lions, elephants, whales, pigs and rabbits. How do we know? Well, scientists have sets of rules which tell them what sort of animals creatures are: whether they are mammals, fish, reptiles, amphibians, birds or insects.



There are two things which tell the scientists that an animal is a mammal. Firstly, all mammals have some hair on their bodies, and secondly, all mammals have glands which produce milk for their babies to drink during the early stages of life. This word 'mammary' is what gives us the word 'mammal'. The whale, the dolphin and the porpoise may look like fish than mammals, but there is always some hair on their bodies, however small the amount, and they suckle their young with their own milk. The duck-billed platypus is perhaps the strangest mammal of them all. It has a beak instead of lips, and it lays eggs rather than giving birth, like people do, to live young. But it is a mammal. After the babies are hatched, the platypus feeds its young with milk it produces itself, and as it also has body hair, we know that it is a mammal.

What are flatfish?

Flatfish is a name given to a family of fishes which includes turbot, halibut, plaice and flounders. The flatfish have a very interesting feature which sets them apart from other fish. They have both eyes on one side of their heads. They are not born like this, but develop this feature soon after they are born. Why? Well, as the name suggests, flatfish spend most of their time lying flat on the bottom of the sea bed. To enable them to see in this position with both eyes, the eye on the lower side of the head moves up gradually to join the other on the upper side, which gives the fish a most peculiar look! As well as the eye, the fish's mouth also moves



slightly, but the lopsided grin this produces doesn't stop members of this family from being very popular as food!

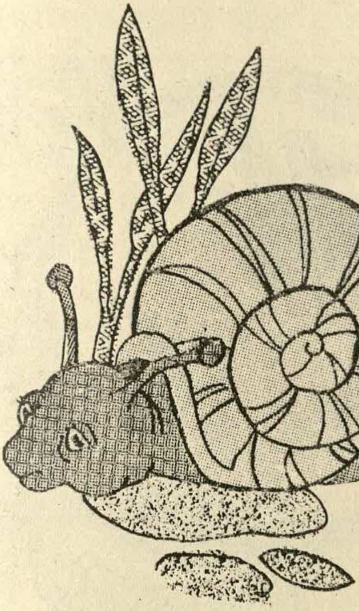
What is a marsupial?

A marsupial is a mammal which has a pouch. Its baby is born at a very early stage of development, and makes its way straight away to the pouch, where its suckles. At first the baby has no powers of suction in its mouth, and so the mother's teat squirts milk into the baby's mouth at regular intervals. Marsupials are found mainly in the continent of Australasia, which includes not only Australia itself, but also New Zealand, Tasmania and a number of small islands, and also in parts of South America. The

best known marsupials are the kangaroo and the koala, which, of course, are natives of Australia.

How do snails walk?

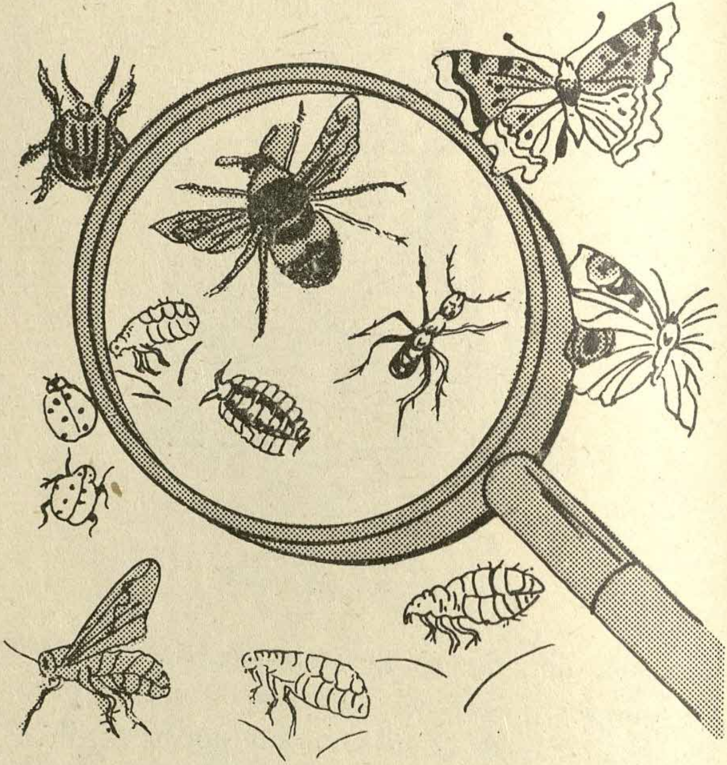
A snail is a member of the mollusc family called a gastropod, word which means 'stomach foot', and this describes the snail very well. The foot on which the snail moves is also the base of its whole body,



and the snail moves by expanding and contracting its muscles, just as we move our muscles. Because the snail's body is so soft and sensitive, like the bodies of all molluscs, it would tear easily on sharp stones or thorns in the snail's path. So the snail secretes a special sticky slime, which covers the base of the foot and leaves a trail on your garden path, and which means that snail can move along easily without much rubbing or friction.

How many kinds of insect are there?

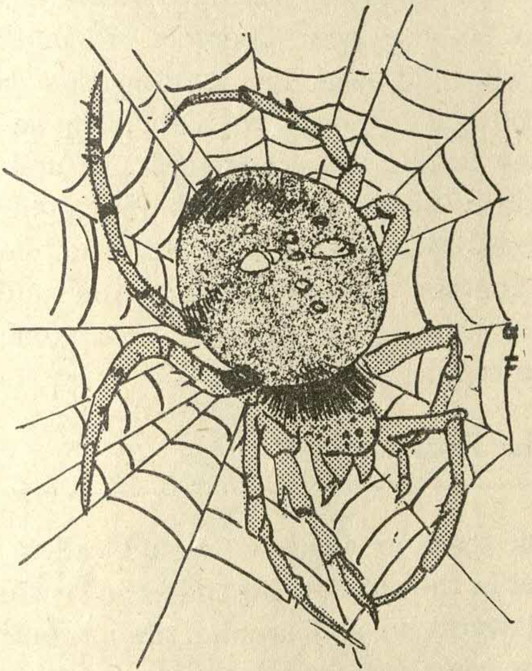
A good question! We know that there are about one million different species of insect, but more are being discovered every day. Except for the sea, every



place on earth has an insect population, and some of these insects are very useful indeed. The honey bee and the butterflies are two of the most useful, carrying pollen from one plant to another and so ensuring that the plant life on earth continues to grow properly. Other insects are dangerous to people, like the tsetse fly, found in tropical regions, which carries the germs of the disease malaria. Not all insects have wings, though most do. Fleas, lice and worker ants don't have wings, and therefore they can't fly, although fleas and lice can jump very long distances in relation to their size.

How do spiders spin their webs?

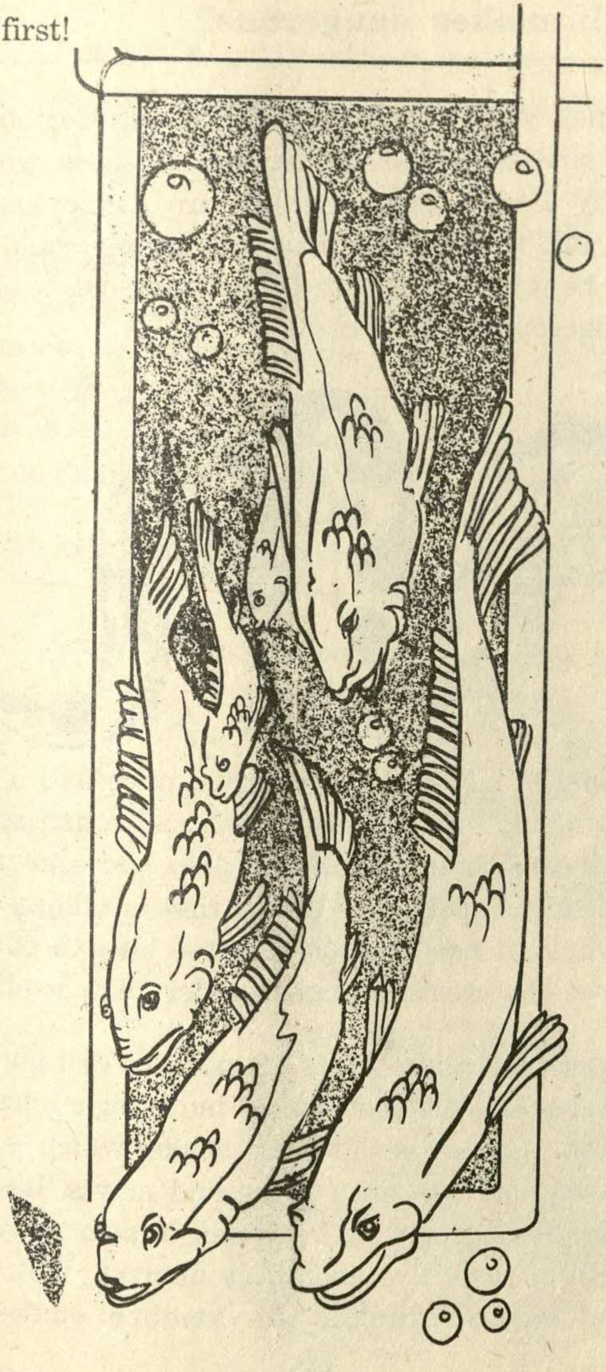
Everybody has seen a spider's web, and admired the skill which the spider has in web making. We know that the substance used in web making is silk, which the spider makes, and that it uses this silk not only for webs but for a whole variety of other purposes. We also know that the type of web varies very much from spider to spider, but have you ever wondered how the spider spins this silk? In the spider's belly, or abdomen, are certain glands



which produce the silk as a liquid. At the tip of the abdomen are spinning organs, which have many holes in them. The liquid silk is forced through these tiny holes, making it very fine and delicate, and then on contact with the air the silk becomes solid. There are different sorts of silk for different purposes - best known is the sticky silk used in webs to trap the insects which the spider eats. Then there is the non-sticky, stronger silk for the spokes of the web, which the spider used to walk along - had you ever wondered why the spider never gets caught in its own web? There is yet another sort of silk, which is used for spinning the cocoon in which the spider's eggs are kept safe and warm until they hatch, and other sorts for making the ropes which spider uses for climbing down from high places. So don't dismiss the common spider as just another animal - in fact, the spider is a master at its art and ought to be treated with a lot more respect.

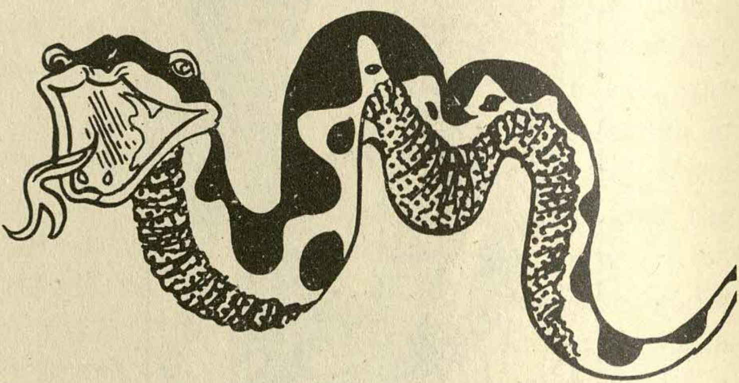
How do fish taste?

Most fish taste in what we would call a normal way - that is, they have taste buds, the organs which detect flavours, in and around their mouths. But there are some fish, in particular those that live in very dark or muddy waters, which do not feed by sight, as they cannot see their prey. These fish have not only taste buds in their mouth area, but also on other parts of their body, so that they can taste their food without actually having to swallow it first!



Are all snakes dangerous?

It depends what you mean by dangerous! Certainly, not all snakes are poisonous, and of those which are, only a very small number are dangerous to people. But in the same way that people could be said to be a danger to the things they eat, snakes are dangerous to their prey.

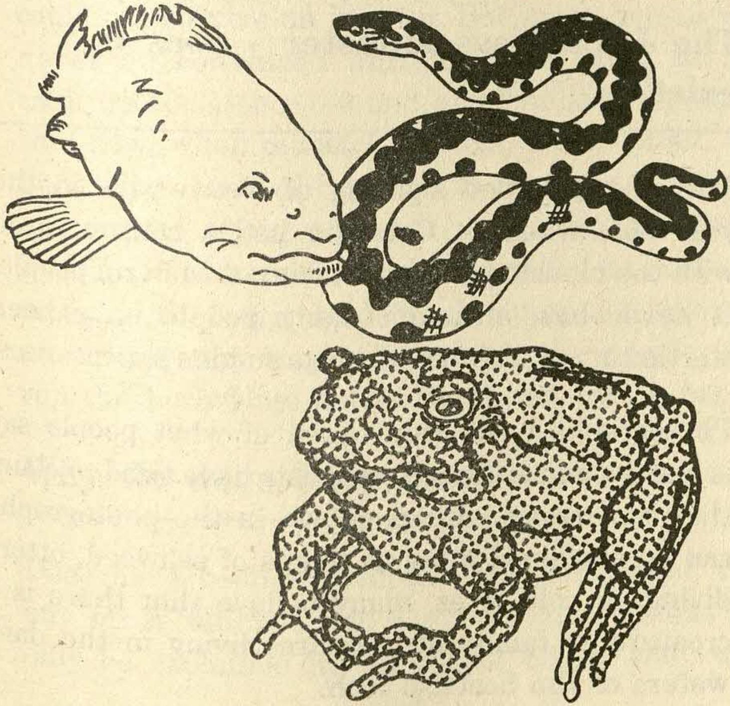


Most snakes kill their prey - rats, mice and other small animals - by what scientists call constriction, which means coiling round the prey and squeezing it to death. Usually the snake then swallows the prey whole; it has specially adapted jaws to enable it to swallow creatures much wider than itself.

There are only three types of snake in Britain; the slow worm is not a snake at all but a legless lizard. The first of these is the grass snake, which is not poisonous and eats mice, frogs and newts. Its size may frighten people: it has been known to reach a length of some five and three quarter feet. The second British snake, the smooth snake, is non-poisonous. It grows only to a length of about thirty inches, and eats insects and lizards. The last snake to be found in Britain is the common viper or adder. This one is poisonous, but although its bite needs immediate attention, it is unlikely that its bite would kill you. The adder usually has a long zigzag band edged with a double row of dark spots on its back, whereas the grass and smooth snakes have indistinct markings or speckles. The grass snake also has a yellowish white collar just behind its head, so you can easily tell the difference.

What does cold-blooded mean?

Warm-blooded creatures such as mammals have a



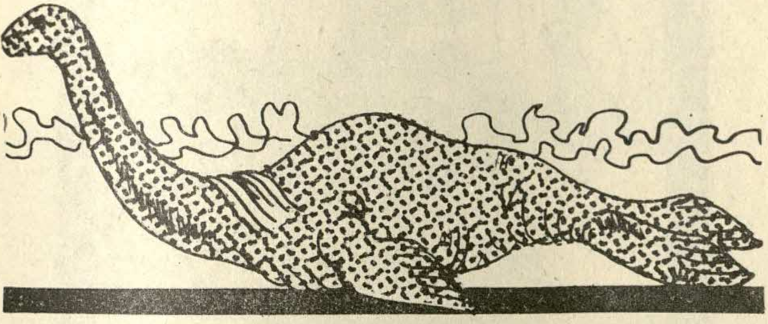
body temperature which stays roughly the same whatever surroundings they are in. This temperature varies from creature to creature, for example the body temperature of any healthy human is 98.4 degrees Fahrenheit. Some creatures are cold-blooded, which means that the body temperature varies according to the animal's surroundings. This means that animals which are cold-blooded have to live in certain areas suitable for their survival. This is one reason why you never find cold-blooded creatures living in very cold surroundings like polar regions - they would die of cold because they would not be able to maintain a body temperature suitable for life. Fish are cold-blooded, so are amphibians and reptiles.

The Loch Ness monster - does it exist?

The first recorded sighting of Nessie was in the year 565, when St Columba had a confrontation with the monster and ordered it not to harm people. It never has, although many people have been startled, if not frightened, by its sudden appearances.

Photographs have been taken of what people say is Nessie, and although scientists have tried to claim that the strange things shown in the photographs can be explained away as lumps of seaweed, otters diving, or cold tyres, many believe that there is a creature or family of creatures living in the dark waters of the Scottish loch.

Underwater photographs have been taken which show shadowy shapes which could be the monster, and these have convinced the famous naturalist Sir Peter Scott that the creature exists. Sir Peter believes that Nessie is related to the plesiosaur, a dinosaur which was believed to have died out about seven million years ago; if this is the case, then there must be a family of monsters in loch. One could not survive on its own. But many people will never be convinced until definite proof of the creature's existence is found, and it must be admitted that now, when monster hunting is so popular, the Loch Ness area of Scotland is almost taken over by tourists trying to catch a glimpse of Nessie. Perhaps if it was ever found and proof of its existence accepted, the tourist trade would slump, and although an old mystery might be solved, the people who run the Loch Ness hotels would not be too happy!



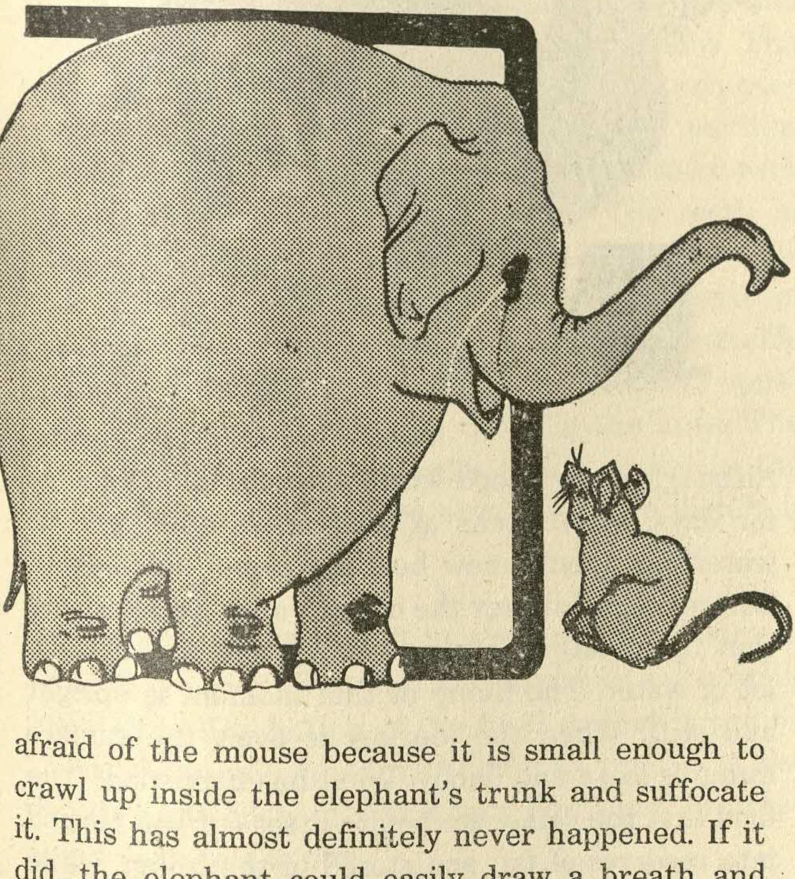
Why do dogs bury bones?

Dogs have been at people's side for longer than any other animal. But a lot of their actions can only be explained by their past before they were

tamed by humans. For example, you may have noticed that a dog turns round three times on the spot before setting down to sleep - this may be because its ancestors had to flatten down a nest in the leaves of the forests or jungles where they lived, before they could sleep. And when a dog stands and bays, it may be doing what its ancestors did when they roamed in packs and had to keep in touch with one another. The same may be true of the bone burying routine. Before people fed dogs regularly, they had to hunt for food themselves, and burying it was the best way of keeping what they found, where their sense of smell could easily find it again.

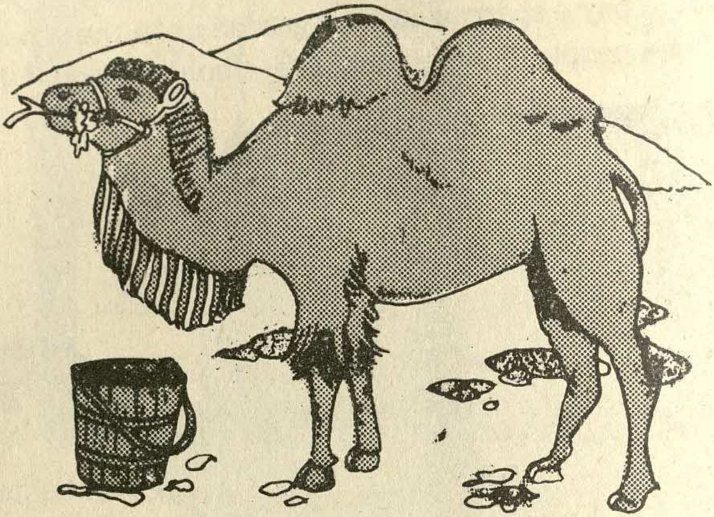
Are elephants afraid of mice?

Although you may have seen many cartoons and films which show elephants being terrified by tiny mice, in reality elephants pay as little attention to mice, which often scuttle around their feet, as you would pay a sparrow in your garden or in the street. Many people believe that the elephant would be afraid of the mouse because it is small enough to crawl up inside the elephant's trunk and suffocate it. This has almost definitely never happened. If it did, the elephant could easily draw a breath and blow the mouse out again.



Why does the camel have a hump?

The camel's best known nickname is 'the ship of desert', and it is very well suited to the camel. The camel is ideally suited to the life it leads in the desert, and its best adaptation is its hump.



Although many people know that the camel can go for days, even weeks at a time, without food or water, not many know how the camel manages it. Before a long journey the camel's owner makes sure that the creature is very well-fed and has drunk a lot of water. The hump at that moment is upright and stiff. When the journey is over, the camel's hump is loose and flabby. What has happened? The food that the camel ate before it set out was turned into reserves of fat, and stored in the hump, while the water was kept in tiny, flask-shaped sacs in the camel's stomach. During the journey, the camel used these stores to keep itself going, and when the trip was over, it had to spend a long time getting its strength back.

What is the difference between alligators and crocodiles?

The crocodiles, alligators, caimans and the gavial make up a group of about twenty reptiles. They all have the same basic appearance and, like the turtles and terrapins, they are all amphibious. The alligator differs from the crocodile in having a shorter and broader snout although there is yet another, more definite difference. In both animals the fourth tooth of the lower jaw is enlarged. The teeth in the narrower upper and lower jaws of a crocodile are in line and so this tooth fits into a groove of the upper jaw, and can be seen when the crocodile closes its mouth. The teeth in the broader, upper jaw of an alligator overlap those in the lower.The enlarged tooth this time fits into a pocket in the upper jaw and cannot be seen when the mouth is closed.

The long, powerful tail of the crocodile indicates that it is a good swimmer. The ears, eyes and nostrils are all in line on top of the head so that it can lie practically submerged waiting for its prey. It is also quite agile on land and leaves the water to breed and bask in the sun.

How dangerous are crocodiles?

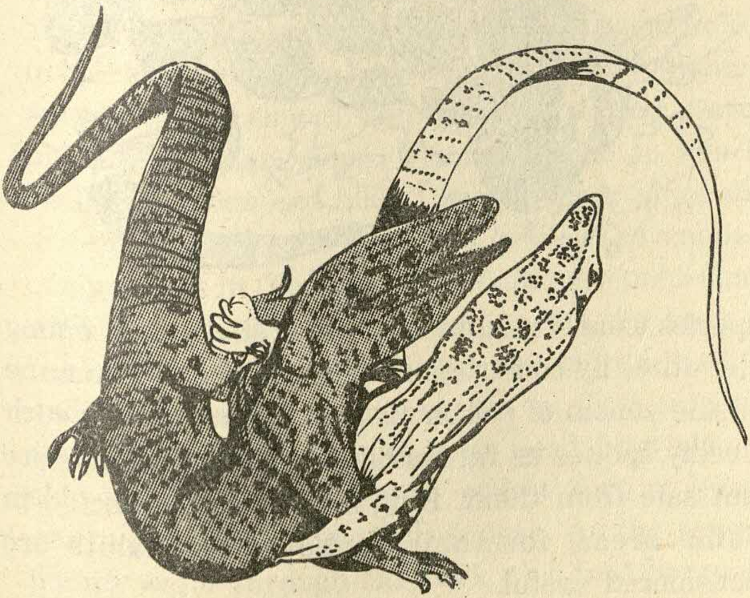
All crocodiles are meat eaters and feed in water. They are particularly successful in catching smaller animals because they can float up very close to their prey without being seen. They catch animals at water holes in this way and, holding them under water, they back off into deeper water until the prey drowns. Crocodiles tear pieces from their victims by gripping with the teeth and turning over and over. Crocodiles mysteriously attack man in only some areas of Africa. They are probably more aggressive when protecting a nest or when the water is drying up. Older 'rogue' specimens perhaps become used to catching domestic animals in a particulars locality and eventually attack the men who tend them.

Which is the thickest snake in the world?

Although it is not the longest snake-this title is claimed by a python-the Anaconda is certainly the thickest. Anacondas grow to 20 feet in length and measured around their fattest part can reach 3 feet in diameter. Naturally such a colossal snake (weighing about 17 stone) cannot move swiftly and so the Anaconda relies on lying in wait for its prey. One favourite place is in the trees that overhang river banks and swamps, and another is in the shallows of the water itself. As animals come down to the water to drink the Anaconda pounces from its hiding place and overpowers its startled prey. The Anaconda is sluggish on land, but it can swim and it can climb up the branches of trees to rest and sunbathe during the day. Although there are stories of it being a man-eater, these are doubtful, no reliable evidence ever having been produced to prove them.

What is the largest lizard in the world?

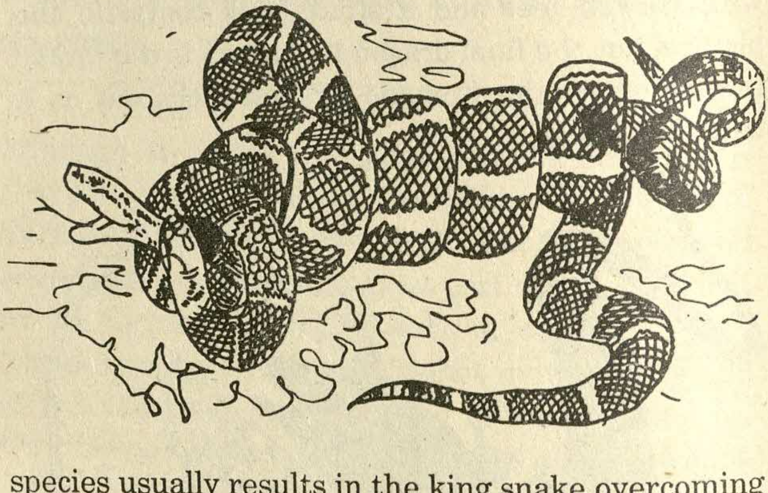
Can you imagine a lizard 10 feet long and weighing 300 pounds? There is a monster lizard of this size called the Komodo Dragon. It is easy to see how it came to be called a dragon. Its long neck supports a large head with cruel-looking jaws and its powerful, thick tail accounts for half its length. Short legs with clawed feet and a stout body complete the picture, but the final dragon-like touch is the forked tongue which the Komodo Dragon flicks out as it trundles along.



Altogether this is a thoroughly frightening lizard. It is said that the tail is fairly ineffective against man, but the terrible jaws would make a serious wound if they clamped on to an arm or leg. The Komodo Dragon is a ferocious carnivore and will kill and eat any smaller animal it can catch. Some have even been reported eating small deer and pigs.

Do snakes eat snakes?

King snakes are particularly fond of eating other snakes although they do not go out of their way to track them down. A chance encounter with another species usually results in the king snake overcoming the other by constriction. King snakes are immune to the venom of poisonous snakes and so even such deadly species as rattlesnakes and copperheads are not safe from them. King snakes are protected in some areas, for their snake-eating habits are considered useful.



What is the largest living bird?

Standing 8 feet high and weighing 300 pounds, the ostrich is easily the largest bird in the world. On African, grasslands it has adopted the habits of a grazing animal and groups roam about feeding in the company of zebras and gazelles. It is well adapted to this sort of habitat. Good eyesight and a long neck enable it to spot danger from a long way off. Powerful thighs and long legs can carry it at 40 miles an hour out of harm's way. It is the only bird with two toes, another feature which enables it to run that much faster over the grassy plains.

Why do flamingos have bent beaks?

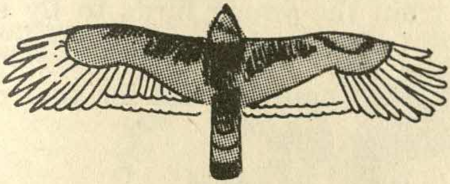
The beak of a flamingo looks as if it has been broken in half and the halves bent downwards and rejoined. As you might expect there is a very good reason for this peculiar shape. Flamingos like to live in shallow lagoons and lakes. Despite their large size and their large beaks flamingos feed on the smallest of organisms in the water. The flamingo stalks along with its head bent right down to dip the beak in the water. In this position the upper half is underneath and the beak is now an ideal scooping organ. The flamingo sweeps its head from side to side through the water to collect tiny molluscs, crustaceans and single-celled algae. As the tongue pumps water through the beak, this food is caught on a sieve-like structure inside and passed down the throat.

What is swan-upping?

The Mute Swan has been a domesticated bird in England for over 800 years. It is sometimes called the 'royal' bird and in fact by the thirteenth century all the swans in England belonged to the Crown. People were allowed to keep swans on open water as long as the birds were prevented from flying away, and they carried their owner's mark. Hundreds of swan marks were developed. Birds usually had a series of notches or a symbol on the orange part of their beak. One man, the Royal Swanherd, was responsible for registering all the marks and for actually marking the birds. Each year he would set out on swan-upping expeditions to gather all the year's cygnets for marking. This ancient practice is still carried out each year on the River Thames where all the swans belong to the Queen.

Where do Golden Eagles nest?

The Golden Eagle is probably the best known of all the birds of prey. It is a magnificent bird, up to 3 feet in length and with a wingspan of up to 8 feet. Golden Eagles patrol enormous areas of remote mountainous country throughout the northern hemisphere. They are long-lived birds which pair up for life, usually returning to the same nesting



site each year. A predatory bird as large as this obviously cannot nest anywhere. The most favoured place for an eagle to build its eyrie is on an inaccessible ledge of a steep cliff, commanding a good view of the surrounding countryside. Here the eagle cannot be approached unawares. In North America eagles seem to prefer to nest in trees. As the eyrie is added to year after year, the weight of sticks sometimes becomes too great, and the nest may overbalance the tree.

What is falconry?

Falconry is the ancient practice of training birds of prey to kill for man. It dates back thousands of years, the earliest falconers probably using the birds as a means of obtaining food. It soon developed into a sport for kings and queens and the well-to-do, and became very fashionable during the Middle Ages in Europe. Today it is much less widely practised, but small groups of dedicated enthusiasts still train birds for this exciting sport. It is not a sport that anyone can take up, however. For a start, in most countries birds of prey are protected species and in Britain you need a licence to take one from the wild. Immense patience and understanding are needed to train the young birds to fly after prey, kill, and then return to the falconer. It is somethings you cannot teach yourself and for this reason the sport is exclusive.

How does the Secretary bird catch snakes?

The Secretary bird prefers to walk around looking for its prey rather than to fly. As a result its feet are less adapted for killing. The Secretary bird strides around African grasslands on its long legs hoping to disturb its prey. It catches insects, small mammals and lizards, but it is best known for eating snakes. It attacks a snake by shielding itself with open wings and trampling and battering the snake with its feet. Its long scaly legs give it good protection and eventually the snake is beaten to death.

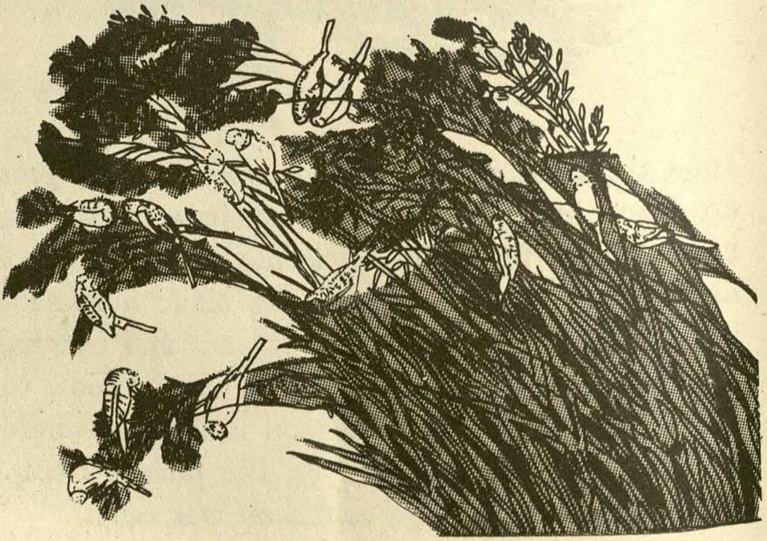
What is the difference between pigeons and doves?

There is no real difference between pigeons and doves. In the pigeon family there are about three hundred species. Some of these are larger and plumper than the others and have square tails - these are often called pigeons. Others are smaller, sleeker and have pointed tails - these are usually called doves. Of the many sorts of pigeons there are, you are probably familiar with at least one type depending on whether you live in the town or in the country. If you live in a town you probably

know the feral pigeon only too well. These pigeons are descended from domesticated birds. They gather in enormous flocks in public places where people like to feed them. They usually make a nuisance of themselves by fouling pavements and building. If you live in the country you probably know the Wood Pigeon best. This pigeon is also considered a pest for it loves to feed on the farmer's crops, so that he has to wage continual war on it.

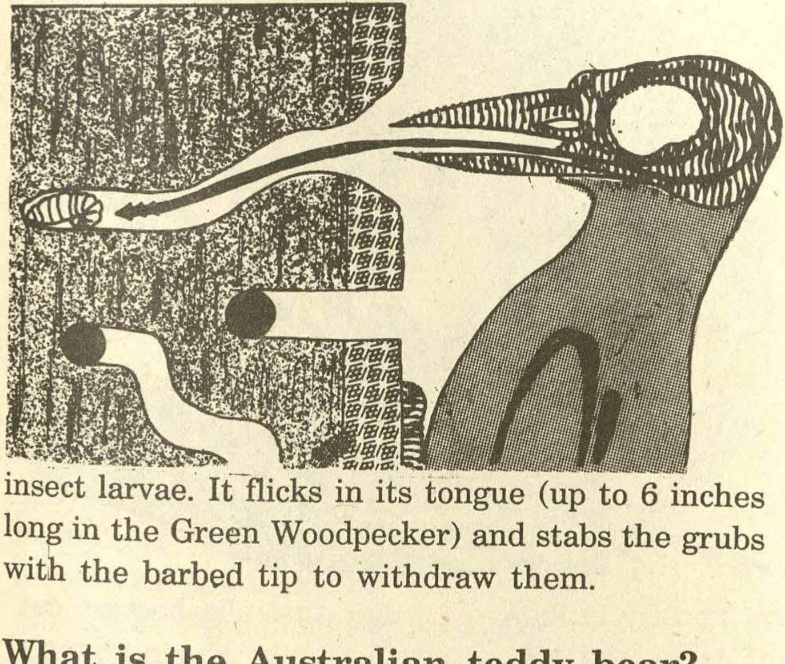
Where do budgerigars live in the wild?

The parakeets are a widespread group of small Old World parrots. Best known is the Grass Parakeet or Budgerigar which is popular as a cage bird in so many homes. Budgerigars come from Australia. Large, chattering flocks feed among the grasses of the wide, inland plains. They eat the seeds of a variety of grasses, the fresh shoots of plants and any small insects they may discover while foraging. If you keep a budgie, do not be surprised if it snaps at a fly or other insect, for it is merely supplementing its diet like its wild relatives. Wild budgerigars are predominantly grass green in colour with yellow heads and blue tails. They make a spectacular sight as they flock each morning and evening to drink at a waterhole.



How long is the woodpecker's tongue?

Drilling the bark of trees with a chisel-like bill, the woodpecker exposes the tunnels of wood-boring insect larvae. It flicks in its tongue (up to 6 inches long in the Green Woodpecker) and stabs the grubs with the barbed tip to withdraw them.



What is the Australian teddy bear?

Practically everyone has owned a teddy bear as a child, but not everyone realizes that the animal it is modelled on is not a bear at all. Bears are placental mammals whereas the Koala, which is often called the Australian teddy bear, is another marsupial mammal grouped with the phalanger family. It is interesting that a number of the marsupials restricted to the Australian region look and act like placental mammals found in other continents. The gliding phalanger is very much like the flying squirrel for example. Why is this?

About fifty million years ago Australia became cut off from the other continents as the mammals evolved. This allowed the marsupials to adapt themselves to live in every kind of habitat, free from competition from the more advanced placental mammals. In every other continent the placentals flourished and replaced the marsupials so that apart from Australia (and America where some opossums have somehow managed to survive), marsupials are found nowhere else in the world. So, in separate continents, representatives from two unrelated groups of mammals became adapted to live in all the available habitats. Where particular conditions were the same in either continent, the animals which evolved to suit them bear similarities in shape and behaviour. This phenomenon is called *parallel* or *convergent evolution.*

What are solenodons?

Solenodons are curious rat-sized creatures with long snouts. They were once found in North America but the only survivors of this ancient group are found on two islands of the West Indies, one species on Cuba and another on Haiti. Solenodons are members of a primitive group of mammals called insectivores. These were the first placental mammals and in general the representatives we know today are small creatures (shrew-like, mole-like or hedgehog-like) which feed on a variety of invertebrates. Solenodons are shy creatures, sleeping during the day and appearing at night to feed. They run clumsily on their toes in a zig-zag course.

Which mammals really fly?

True flapping flight, almost as proficient as that of the birds, has been achieved by only one group of mammals, the bats. Bats probably evolved from a group of early insectivores that fed by leaping from the branches of trees to catch passing insects. It is interesting that bats fly by cupping their wings in front of the body and dragging this air behind them, rather than flapping their wings up and down.

Bats can be arranged into two large groups: fruit-eaters and insect-eaters. In general the fruit-eaters are large, can see well and fly in dim light. Insect-eaters are usually smaller, have poor eyesight and have developed a good system of echo-location to enable them to fly in pitch blackness. By sending out series of ultrasonic squeaks and listening for the returning echoes with very efficient ears, the bats can navigate their way around obstacles and catch their insect prey in darkness.

What is the difference between monkeys and apes?

The apes are divided into three groups: the gibbons, the great apes and man. Apes differ from monkeys by being tailless, having arms longer than legs and by being more intelligent.

Which animal spends its life upside-down?

In contrast to the acrobatic antics of the monkeys and apes, sloths move about the tree-tops in very slow motion. They hang underneath the branches from hooked claws of both the fingers and toes, and spend most of their lives in this upside-down position. They eat, sleep, mate and even give birth to their young upside-down. There are two interesting features of a sloth related to its upside-down way of life. The first is its ability to turn its head almost right round to compensate for its reversed position. The second is the way its hair lies in the opposite direction to that of most animals. The sloth's hair runs from its belly round to its back, and this ensures that heavy tropical showers run straight off.

Where do chimpanzees sleep?

Every night the chimpanzee spends five minutes making its bed for the night. It bends two or three leafy branches together to make a platform quite high up in the trees. It curls up on its side with legs drawn up and soon falls asleep.

How far can a jerboa jump?

Jerboas are small rodents that look rather like miniature kangaroos. Their back legs are four times as long as their front legs, and the tail is longer than the head and body put together. Like kangaroos they travel by leaps and bounds and at top speed can cover 10 feet in a single jump. The tail trails behind and helps to balance the jerboa as it shoots through the air, often faster than the eye can see. Jerboas live in desert areas of Asia and Africa and escape the fierce heat of the day by hiding in cool underground burrows.

What makes whales mammals?

The whales are a large group of aquatic animals that vary in size from about 4 feet in length to nearly 100 feet. During the evolution of mammals tens of millions of years ago one group returned to live in water. These mammals became streamlined in shape, developed a powerful tail and front limbs for use as steering fins, and lost the use of the back limbs. Whales, descendants of this group, are mammals because they breathe air, are warm-blooded and suckle their young with milk. They have lost the mammalian coat of hair in order to help them swim, but they have replaced it with an insulating coat of thick blubber.

Do whales spout water?

You have no doubt seen films or photographs of whales sending up impressive plumes of what looks very much like water. The usual cry of whalers is 'Thar she blows!' for this was and occasionally still is the way the whales are spotted. However, the spout is not so much water as steam. After a dive lasting perhaps up to an hour, the used air in the whale's lungs becomes hot and laden with moisture. As it rolls on the surface the whale opens its single nostril, the blowhole, and blasts this warm humid air into air which is often freezing cold. The moisture in the whale's breath immediately condenses and it is this that pin-points its position as a spout visible from a considerable distance.

Which dog cannot bark?

The Dingo is one of the very few dogs in the world that is unable to bark. It is not a silent dong, however, as it makes up for not barking by howling and whining very loudly indeed. Dingoes are a very ancient breed of wild dog from Australia. They are probably quite closely related to the primitive dogs from which our domestic dogs of today evolved. Dingoes must have arrived in Australia with the first Aborigines to settle there from Asia. They soon went wild although the Aborigines of today still rear pups and train them for hunting. Dingoes are considered a pest in Australia because of the large number of sheep and cattle they kill every year.

How many wolves are there in a wolf-pack?

Each autumn the cubs born to a pair of wolves join their parents in hunting as a family group. A typical wolf-pack like this may have five members, but if the winter is particularly hard, family packs join up to form a larger pack. A large wolf-pack rarely has more than thirty wolves, however.

Which bears wear 'glasses'?

The small bear from tropical South America has rather odd face markings. The bear has a creamy yellow snout, and fur of the same colour runs from its nose in various patterns. Sometimes the lines of lighter fur encircle the eyes and cross the nose, giving the bear the comical appearance of wearing a pair of glasses. Not surprisingly the bear has come to be called the Spectacled Bear although the markings are never the same in any two bears. Some Spectacled Bears may have only the bottom half of their 'glasses', whereas in other the eye rings are so thicky they completely fill the face.

Can an elephant drink through its trunk?

This is the equivalent of asking, 'Can you drink through your nose?' and of course the answer is no. The elephant's trunk is an extension of its nose and upper lip. It does not just hang limply but can be operated to carry out a vast range of tasks. The most important of these is food gathering. The sensitive finger (or fingers) at the tip of the trunk enables the elephant to pluck foliage and pass it into the mouth. The trunk is also used as a hose pipe. It can squirt water or dust over the elephant, and can also squirt over a gallon of water straight into the mouth when the elephant is drinking. Other uses are as a snorkel or breathing tube when the elephant is swimming, as a lifting device, as weapons for defence and lastly, for smelling, of course.

Why are zebras striped?

This is the most obvious question to ask about zebras but unfortunately nobody really knows the answer. Looking at zebras in the zoo, the striped patterning seems very conspicuous and could hardly be thought of as protective. One theory, however, claims that this is, in fact, so. The bold stripes may serve to break up the shape of the zebra. From a distance, across the shimmering grassy plains on which the zebra lives, the blurred collection of stripes that the lion or tiger sees may not be instantly recognizable as an animal.The patterning is variable and no two zebras are exactly alike. It is interesting that African people think of zebras as black animals with white stripes whereas we think of them as white animals with black stripes.

What does a camel store in its humps?

You have no doubt heard stories about the wonderful endurance of camels plodding through the desert for days without a drink, living on the water stored in their humps. The claims for the camel's endurance are often exaggerated but it is true that this animal can survive for several days without taking water. However, the camel does not fill its hump with water before it starts such a journey, rather as you might fill a car's tank with petrol. The humps are composed of fatty tissues which break down to give energy during periods when the camel is without sufficient food. Water is stored by the camel in its tissues and it draws on this supply as it plods along. After a long journey the camel is usually very thin and dried up and it takes an enormous drink as soon as it can, to make up the loss. It drinks over 20 gallons of water in ten minutes.

Do all camels have humps?

Apart from the species of camel already mentioned, there are four other members of the camel family which do not possess humps. These are the Llama, Guanaco, Alpaca and Vicuna, all from South America. From the time of the Inca civilization these animals have been domesticated by man, and to this day they are invaluable to Indians living at high altitudes. They are used mainly as beasts of burden and will happily bear loads of up to 100 pounds in weight if properly handled. A Llama that is annoyed will spit in the face of the offender with great accuracy.

What is the Okapi?

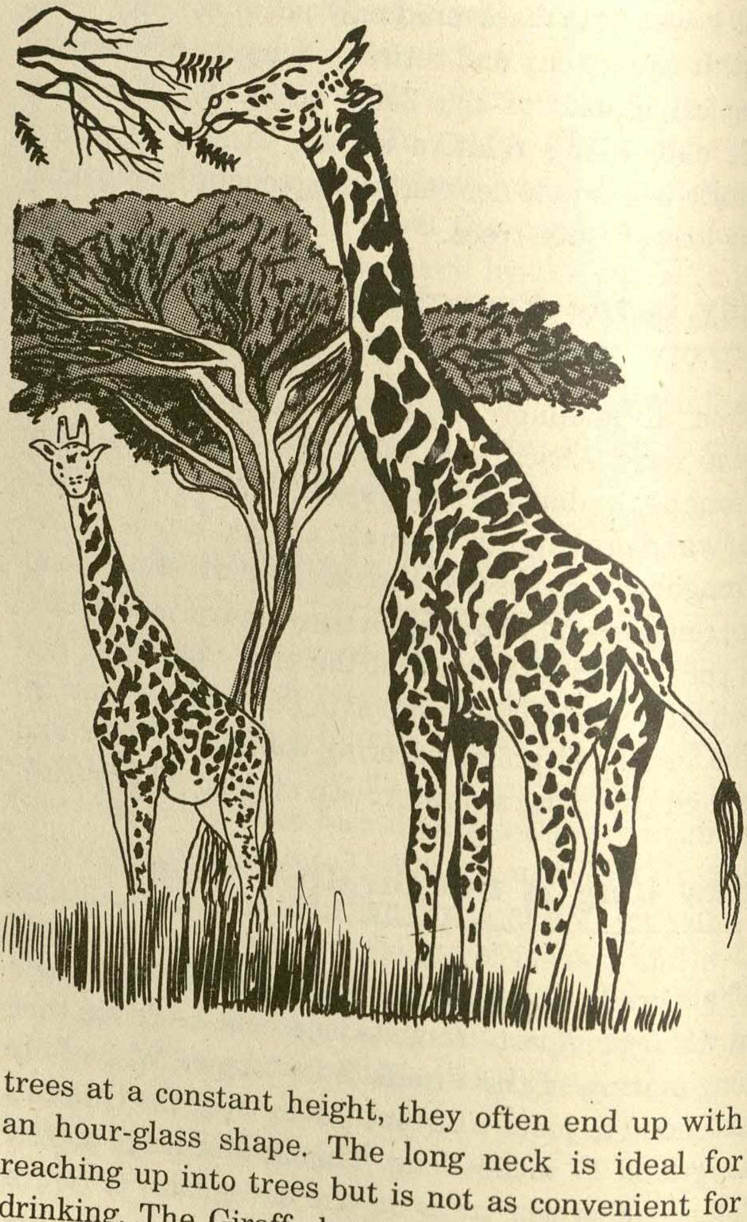
The Okapi looks as if it is a cross between a zebra, a donkey and a giraffe. It is a very recognizable animal and is quite large, as big as a horse, and yet it was first discovered only about seventy years ago. It is very shy and retiring, living in the densest tropical forests of the Zaire basin. The Okapi is the only living relative of the Giraffe. It has a giraffe-like supple neck and a long tongue for plucking the leaves from trees.

Why is the Pronghorn so called?

Often misleadingly called an antelope (antelopes come from Africa and Asia), the North American Pronghorn derives its popular name from the forward-pointing branch of its horns. The Pronghorn's horns are extremely interesting. They are composed of two parts: a bony central cone which is permanent like those of the true antelopes, and a sheath of fused hairs supplying the horny covering. The branched horny covering splits each year and is shed revealing a new growth of horn underneath.

How long is the Giraffe's tongue?

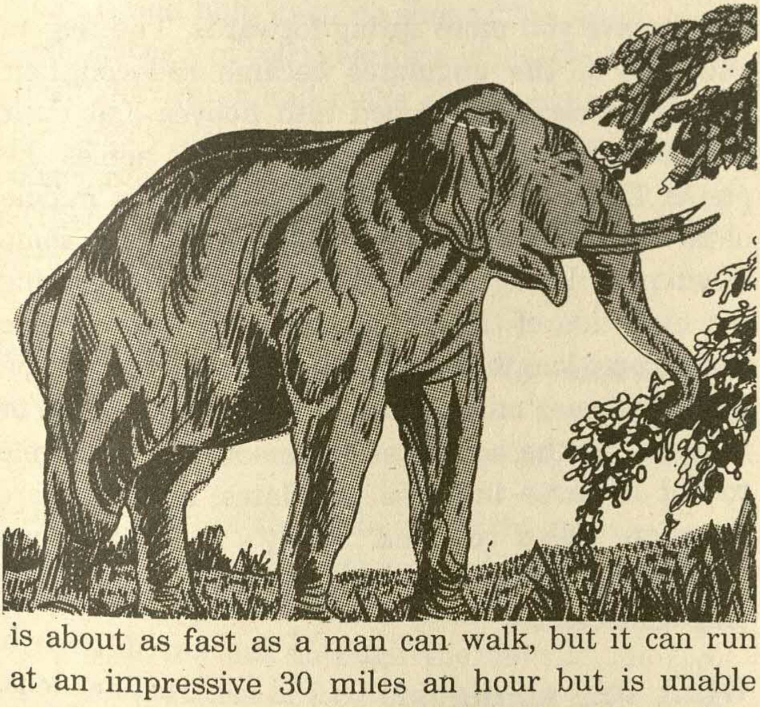
The Giraffe is easily the tallest of the mammals at 18 feet. Apart from its legs and neck another long feature of the Giraffe is its tongue. When fully extended to pluck a distant leaf or twig, the Giraffe's tongue is 17 inches long. The Giraffe feeds on the foliage of acacia trees on the savannahs of South Africa, and because it usually browses around the



trees at a constant height, they often end up with an hour-glass shape. The long neck is ideal for reaching up into trees but is not as convenient for drinking. The Giraffe has to splay its front legs or bend its knees in order to reach the ground to drink.

What is the largest living land mammal?

The largest land mammal living today is the African Elephant. A fully grown male measures 11 feet high at the shoulders and may weigh over 6 tons. It eats 700 pounds of vegetations and drinks over 50 gallons of water in a day, its trunk having a capacity of 1.5 gallons. It can walk at 4 miles an hour, which is about as fast as a man can walk, but it can run at an impressive 30 miles an hour but is unable to jump the smallest of obstacles. There is another species of elephant found today. The Indian Elephant has smaller ears, a more rounded back, a trunk with one 'finger' at the end (rather than two), a domed forehead and a smaller overall size.



Which hoofed mammals are odd-toed?

It seems strange to refer to animals as either odd-toed or even-toed but that is how the two groups of mammals that are hoofed - the ungulates - are distinguished. The herbivorous ungulates evolved on firm grassy plains - ideal places for running at high speed. The fewer fingers and toes an animal has the faster it can run. This is why you run on the very tips of your toes when you sprint for a bus, to give you more spring forwards. The fingers and toes of the ungulates became reduced,their remaining claws developed into hooves and their legs lengthened to allow fast galloping across the plains. If you draw a straight line down the middle of an ungulate's foot (this is called an axis), in some it will pass through the middle finger or toe. During the evolution of these ungulates this finger or toe has become lengthened and developed into the hoof, while the toes on either side have become lost or reduced. So the hoof is either made up of just one toe or of three in these ungulates, and they are therefore called odd-toed. Today's representatives of this group are horses, asses, and zebras, and tapirs and rhinoceroses.

What are sponges?

Sponges are very primitive many-celled animals. They live in both fresh and sea water and encrust rocks and underwater objects in strange lumpy masses. Some spread over considerable areas, others hang in finger-like clusters, while others stand erect, branching irregularly up to 5 feet in height. Sponges are interesting because they represent a more advanced stage of development that the colony of protozoans. They belong to the phylum Porifera. An individual sponge has a definite vase-like shape, and group of the cells of which it is made are adapted to carry out special tasks. The cells of the wall of the sponge are called 'covering cells', and these protect it and help keep its shape. The inside layer of cells consists of cells bearing a whip-like flagellum to lash the water and make a current, as well as other cells which form pores on the outside of the sponge. Between the two, amoeba-like cells occur and these secrete strengthening rods called 'spicules' which make the sponge rigid.

How do sponges feed if they cannot move?

As the flagellae of the cells inside the sponge beat the water, a current is set up and water is drawn through the tiny pores into the centre of the sponge and then driven out through the hole at the top. Suspended particles of food in the water are caught on the flagellae of the cells and passed back to the amoeba-like cells. Another function of these cells is to absorb the food particles filtered from the water and to transport the digested food to the other parts of the sponge. The cells bearing flagellae can only deal with a certain size of food particle, and so no matter how large the sponge, it must feed on microscopic particles such as bacteria and protozoans suspended in the water.

Where do bath sponges come from?

The sponge with which some people regularly soap themselves in the bath is really the skeleton of a particular type of natural sponge. Bath sponges are supported by a framework of a resilient, elastic material called 'spongin', and it is this that makes up the bathroom sponge.

Bath sponges are found in warm shallow seas, and in various part of the world 'sponge farms' were once established and bath sponges grown from cuttings for eventual sale. Few such farms still exist, but sponges are still grown commercially in the Greek Islands and in the Philippines. The increased use of synthetic sponges - cheaper to produce, although not as hard wearing - has meant that there is now little demand for natural sponges, except for cleaning and polishing in certain industries.

What is coral?

Coral, which people often collect as decoration, is the hard, dried skeleton composed mainly of calcium produced by colonies of small animals very similar to anemones. The polyps of living coral live in tiny cups in the skeleton and are continually adding to its mass. The coral grows into a variety of shapes. Some species produce numerous branches and in others the polyps are arranged in twisting rows on a rounded mass.

Coral thrives in warm shallow water and it forms extensive reefs along tropical shores, particularly in the Pacific and Indian Oceans. The protection the reefs provide make them ideal habitats and they support crowded communities of fishes, many kinds of invertebrates and seaweeds.

How are coral reefs formed?

There are three types of coral reef: fringing reefs grow close to the shore in shallow water; barrier reefs grow parallel to the shore but are separated from it by a deep channel which may be several miles wide; and atolls which are circular islands of coral enclosing a lagoon, often hundreds of miles from any other land.

There are numerous theories to explain the formation of these types of reefs. The most popular is that one type developed from another in a gradual transition so that all three are different stages of the same process. If a landmass with a fringing reef begins to sink into the sea, as long as the coral can grow at an equivalent rate to the subsidence, the reef will grow further and further from the coast. Eventually a barrier reef is formed some way from the shore. If the process continues and the landmass disappears altogether, a ring of coral will be left forming an atoll. This is the simplest explanation for the formation of reefs; the actual processes involved are more complex.

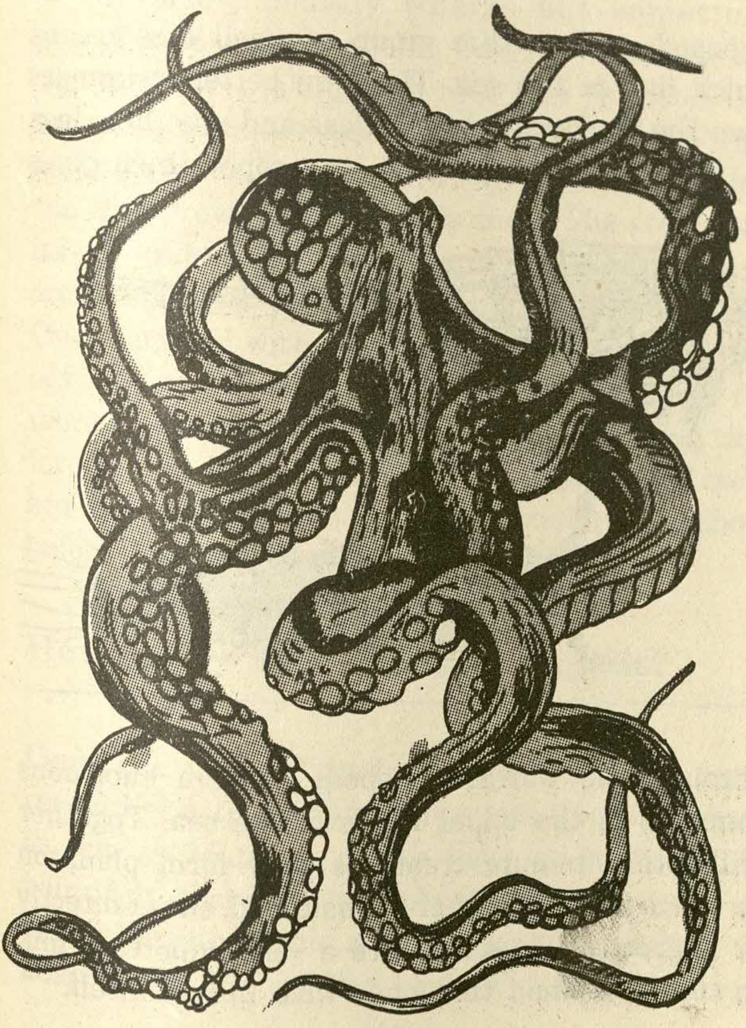
What is a cuttlefish?

You have probably noticed 'cuttlebone' pushed between the bars of a budgerigar's cage, or washed up on the beach. This 'bone' is not really bone at all but the shell of a cuttlefish, which is not a fish but a mollusc. The cuttlefishes, squids and octopuses belong to a group of molluscs called cephalopods and most are characterized by a very reduced shell or by not having one at all. The shell in the cuttlefish is completely enclosed by the mantle and, being very light, it helps to keep the animal buoyant.

The foot of all the cephalopods is modified to form either eight or ten tentacles which surround the head (cephalopod means head-footed). These bear suckers along their length and it is with them that the animals catch their prey. The edge of the mantle of the cuttlefish forms two flaps at the sides and by undulating these the animal swims about quite leisurely. In an emergency, greater speed is obtained by forcing out a jet of water from the mantle cavity through a funnel. The funnel can be directed in any direction and if suddenly attacked, the cuttlefish can shoot off out of danger.

Is an octopus dangerous to man?

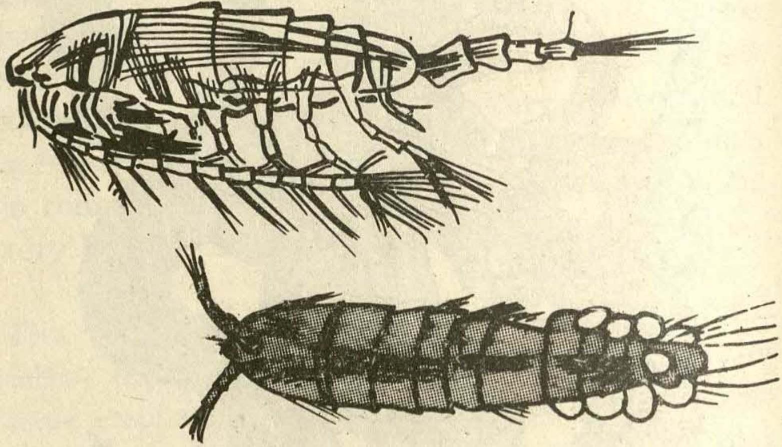
There are stories of people being attacked by an octopus and frantically trying to detach the suckers



of the encircling arms. This may happen very rarely and when it does the octopus is really investigating a new moving shape rather than attacking it. If the person could manage to keep perfectly still the octopus would soon let him go.

What are copepods?

Copepods are another group of small crustaceans which live in the sea. They are better swimmers than the freshwater water fleas and use their legs as well as their antennae to propel themselves



through the water. Copepods drift in enormous numbers in the upper levels of the sea. Together with other minute creatures they form plankton on which all other higher animals feed, either directly or indirectly. Thus they are a very important link in the food chain that ends with man himself.

Why does the Hermit Crab live in a shell?

The hermit Crab is soft-bodied and so would be extremely vulnerable to its enemies if it had no protection at all. For some reason it has become adapted over time to living within the old shells of molluscs, usually whelks but sometimes periwinkles and top shells. Only two pairs of legs are used for walking, the rest grip the shell and the claws block the entrance if the crab is frightened and withdraws. You may wonder what happens when the crab grows too big for its shell. The crab sheds its skin and then carefully examines the empty shells around to see if they are suitable for its next home. Once satisfied with one it quickly scuttles from the old into the new and takes up residence in the more spacious accommodation. It is a worrying time for the crab for it must expose its unprotected body, but it usually makes sure no predators are about before making the move.

How many legs has a centipede?

Centipede means 'hundred legged' but not many centipedes actually have as many as this. Some have as few as 15 pairs, others have as many as 173 pairs, but most sorts have about 35 pairs.Centipedes and millipedes form a small group of arthropods adapted for life on the land. With all these legs they run very quickly and although it has been discovered that the legs sometimes cross, the centipede never seems to trip up. Centipedes can sometimes be found in the home but usually live under the bark of fallen trees and under stones. They are generally about 1 or 2 inches long but species from North America can grow to 7 inches.

What is the difference between a centipede and a millipede?

A millipede does not have a million legs but it has twice as many as a centipede about the same length - two pairs to each segment. In spite of this the millipede moves more slowly than the centipede. It feeds on vegetation and often destroys valuable crops like potatoes, whereas the centipede is a carnivore and catches worms, spiders and insects, sometimes including flies.

Millipedes are interesting animals. At various times they have been known to swarm and once in France their seething numbers brought a train to a standstill. As they are blind their mating signals are highly developed. It has recently been reported that one type of millipede from Europe attracts a mate by banging its head on the ground.

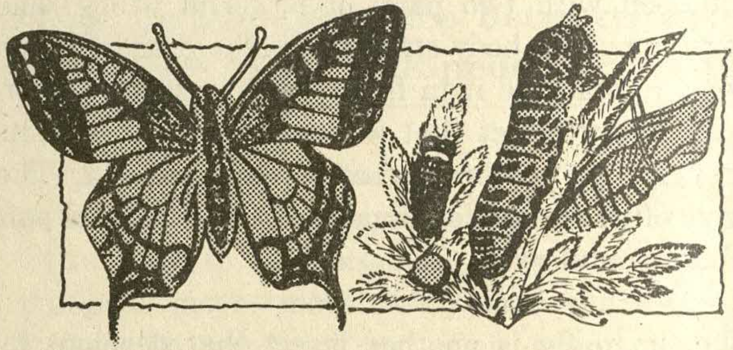
How fast can a dragonfly fly?

It is very difficult to estimate the speed of insects in flight but it is thought that some dragonflies can reach 30 miles an hour. Dragonflies are easily the most skilled fliers of the insects. You may have seen them on a summer's evening along the river bank, flitting and darting in vivid flashes of beautiful iridescent colour. You can see from their shape that they are well adapted for strong flight and acrobatic manoeuvres to catch other flying insects.They are equipped with two pairs of powerful wings. The very elongated body streamlines the dragonfly and helps to stabilize it in flight. As you might expect, a predatory insect that weaves and dives after its prey in the air must have good eyesight. The dragonfly's head is dominated by an enormous pair of compound eyes.

The dragonfly is another insect that develops by incomplete metamorphosis. This is to say that, on hatching, the larva resembles its parent with only slight modification so that it can lead a life in a different environment. The female dragonfly lays her eggs in water. The larvae, or nymphs, lead an underwater life for two years before they finally emerge to change into adults. The nymph is as much a greedy predator as its flying parent although not so active. It creeps stealthily among aquatic vegetation and catches the fry of fishes, tadpoles and other insects. It seizes its prey using a specially extendable jaw called a mask. At rest this is folded up under the head and partly covers the face. Once a young fish swims within range the mask is flashed out and a pair of claws closes on to the prey to secure it.

How do locust swarms start?

One of the three types of locust that forms swarms in Africa is the Desert Locust. This locust usually lives like a grasshopper in what is called a solitary phase. Sometimes, however, all the solitary locusts from a wide area are driven together, perhaps by the weather, and they may find the conditions just right for feeding and mating. As locusts mate and lay eggs many times in a short period, enormous numbers of young locusts hatch and become stimulated by each other to form a swarm. They change colour and when all the available plants have been eaten they migrate in search of more.



Which insects build enormous mounds?

This enormous mound in northern Australia houses a termite colony. It is made of chewed-up vegetable pulp mixed with earth and cemented together to form a hard protective home for the termites. Inside they live within a maze of air-conditioned tunnels for they are able to regulate the temperature and humidity inside the mound. Termites are social insects. This means that within the colony there are various types of termite, each specialized to do a particular job in the running of the group. All the eggs are laid by just one female - the king. Some of the eggs hatch into worker termites which gather the food and maintain the nest structure. Others develop into soldier termites and protect the colony from intruders.

Termites come from various parts of Africa, Asia and Australia and build mounds of varying shapes and sizes. They feed on moist vegetable matter, in particular, wood. They are not able to digest the cellulose of plant cell walls themselves, however. Within their gut live bacteria and protozoa which carry out this job for them.

How does a termite colony start?

When conditions are right special fertile winged termites hatch within the mound. They suddenly leave the rest in a dense swarm and disperse. After travelling a short way they drop to the ground and break off their wings which they no longer need. A male and a female pair up, choose a suitable home, perhaps in an old rotten log, mate, and produce young. The offspring are the pioneer workers and soldiers of the new colony. As more and more eggs are laid and hatched, and a nest built, the colony gradually becomes established. The original pair - the king and queen - remains within the nest for years and years, simply producing a continuing supply of new termites.

Where do butterflies lay their eggs?

Butterflies, and moths as well for that matter, are very particular about laying their eggs. Most butterflies leave them on only one sort of plant because this is the plant that the newly hatched larvae, called caterpillars, will feed on. So the female butterfly will spend some time finding the correct plant (the foodplant) before laying her eggs. You might think that for an insect this would be particular enough, but most butterflies even choose a particular place on the foodplant for the eggs and will leave them in no other. For example, one species of brimstone butterfly will only lay eggs on the topmost shoots of the buckthorn bush. You would never find them if you searched lower down the plant.

What is the king crab?

The king crab, or horseshoe crab, is not really a crab at all. In fact it is not even a crustacean but a very primitive arthropod which belongs to a group of its own. From fossil evidence we know that king crabs were abundant in seas about 175 million years ago. The few species that survive today are virtually unchanged from those early ancestors and for this reason they are sometimes called 'living fossils'.

King crabs have some unusual features. They are about a foot across, have a heavy domed shell divided by a joint across the middle, four pairs of walking legs and a long spiky tail. The bony mouth extends between the bases of the legs which help in chewing up the food. These characteristics, together with their gills and mouthparts, tell us that the king crab is actually descended from the forerunners of another group of arthropods adapted for life on land - the arachnids. These include the scorpions, spiders, mites and ticks, and daddy long legs or harvestmen.

Can a scorpion kill a man?

Scorpions are particularly ferocious animals, even to each other, and so they lead solitary lives. They live in dry, warm, areas of the world and in the wild hide themselves away in dark places, under logs or stones, for example, waiting for their prey. This normally consists of small insects and spiders. As scorpions cannot see very well they rely on these creatures brushing against them unawares. They are immediately pounced on when this happens, overpowered and torn apart by the scorpion's pair of large pincers. Only if resistance is met will the scorpion bring its deadly sting into action, usually held out of harm's way over its head.

The habits of scorpions make them particularly dangerous to man. They are attracted into homes and find ideal hiding between two and three weeks before the larvae emerge. Their first meal is generally the empty egg shell and it is thought that this contains certain essential food substances that the caterpillar must have in order to survive.

How does a starfish move?

The starfished and sea urchins creep slowly around on hundreds of hydraulically operated tube feet. If you flip a living starfish over you will see rows of these tiny feet running the length of each arm. (If you leave the starfish upsidedown, time it to see how long it takes to turn itself the right way up again. Some can do it in two minutes, others take over an hour.) Each tube foot is connected to a muscular sac embedded inside the arm of the starfish. All the feet are joined up by a system of tubes which draws in water from the sea. The whole arrangement is called the water vascular system. The sac contracts and pushes out the foot under pressure. A suction disc at the end grips the sea floor, the foot contracts forcing the water back into the sac, and the starfish is drawn along a fraction of an inch. Each foot would have little effect on its own but when the feet are used in relays the starfish has a speed of 2 inches a minute.

Do all spiders spin webs?

Most spiders spin webs of one sort or another but only some use the web to entangle their prey. The trapdoor spiders from tropical and subtropical countries are spiders that spin a tubular web in a hole in the ground. The hole the spider digs may be several inches deep and about an inch across. The web is spun to line the hole and once this is done the spider constructs a hinged trapdoor to fit the opening exactly. This is made from silk and small soil particles and is very often camouflaged with moss. This well-made retreat is a perfect home for the spider. If disturbed by its enemies it simply hangs on to the underside of the trapdoor, preventing it from opening. It is not fully known how the trapdoor spider catches it prey. It is thought that is peers out from the hole with the trapdoor ajar, and drags insects back into the hole as they pass by.

How does a starfish open a mussel with its feet?

Have you ever tried to prise apart the shell of a mussel or an oyster? It is practically impossible to do by just pulling, so how does the starfish manage it using only its tiny feet? The secret is that the starfish again uses its feet in relays. It hunches itself over the tightly closed shell and attaches its tube feet to either side. By resting some feet and pulling with others the starfish is able to exert a strong pull over a long period, and gradually the bivalve weakens until it gives up the test of strength. Once the valves open a fraction the starfish turns its stomach inside out and pushes it into the shell to digest the contents.

What do skates eat?

Living on the bottom the skate naturally feeds on the other animals it finds there - crabs, lobsters and oysters and other molluscs. It has strong curshing teeth to deal with these shelled creatures. To get at choice molluscs buried in the sand the skate will flap away with its pectoral fins and gradually work its way under the surface. It will then often sit there with eyes and spiracles above the surface.

How dangerous is the stingray?

There are over one hundred kinds of stingray, widely distributed throughout the seas of the world. They all have longer and thinner tails than other rays and skates. Projecting from the top of the tail near the body end they have at least one but sometimes two sharp spines. These would be dangerous enough but the spines have poison glands, and stabs in the chest and abdomen have proved fatal on a number of occasions. When provoked the stingray can whip its tail round in a long, sideways thrust, or it can stab forwards over its head at its enemy.

How does a sea cucumber avoid attack?

Sea cucumbers are echinoderms that have a tough leathery skin rather than a spiny one. Lying around on the sea floor in tropical and subtropical countries they look rather like long fat sausages with tentacles at one end. They feed by poking the sticky tentacles around and then placing them one by one into the mouth. All the food fragments are sucked off as the tentacle is removed, almost like licking marmalade from your fingers. To prevent being eaten by crabs, fishes and starfishes, many sea cucumbers produce a poison. Others when molested will eject long white sticky threads from the rear end to enmesh the attacker. More spectacular still are those species that partially turn themselves inside out when alarmed and rapidly shoot out their branched respiratory organs, reproductive organs and some intestine for good measure. This really confuses the attacker, allowing the cucumber to escape. It later grows a new set of everything that is missing.

What is the largest freshwater fish in the world?

The Arapaima from South America is generally thought to be one of the largest freshwater fishes in the world. The biggest one found is said to have been 15 feet in length with a weight of over 400 pounds. Most are between 7 and 8 feet long with a weight of 200 pounds, but even this is a colossal size for a freshwater fish.

What are hatchet fishes?

It seems a strange name but some of these fishes really look like a hatchet or chopper. They are very thin fishes, flattened from side to side. The front half of their body is very deep and shaped like a blade. There are two groups of hatchet fishes, one that lives in the sea and one that lives in fresh water.

The marine hatchet fishes are small, ugly deep sea fishes. They have enormous eyes and flashing light organs along their sides. They hang motionless in the water and do not do much normal swimming. Instead they migrate to and from the surface each night to feed on plankton.

The freshwater hatchet fishes come from South America. They are said to be the only fishes that can truly fly. They leap from the water and propel themselves through the air for short distances by beating their enlarged pectoral fins.

Which goldfishes are freaks?

The wild goldfish is a very common fish from China, usually green or brown in colour. About a thousand years ago the Chinese noticed that red forms of the wild goldfish occasionally appeared. They started to keep these more attractive forms in ponds and bowls and managed to breed them. Since then goldfishes have always been popular as pets and many different varieties and forms have been produced. Some of these are so bizarre they barely resemble fishes at all. The Lionhead Goldfish for example, has a large head grossly.

Is the dolphin a fish or a mammal?

It is a confusing fact that there is both an air-breathing mammal called dolphin that lives in the sea, and also a true fish of the same name. There are two kinds of dolphin fish. One is quite large and grows to about 5 feet in length, and the other is similar in looks but grows to only 2 feet. The favourite food of the dolphin fish is flying fishes and they chase them at speeds of over 35 miles per hour under water.

Which fish spits at insects?

The archerfish from South-east Asia has the remarkable ability of shooting down insects from overhanging vegetation with water pellets. Its aim is quite accurate and it can usually dislodge a beetle or a fly about four feet away, so that it falls in the water. The archer fish then pounces on the insect and eats it. It is interesting to discover how the fish is able to project accurately drops of water over such distances. The roof of the mouth forms a long groove. If the fish suddenly closes its gill covers, water is forced from the gill chamber into the mouth. At the same time the tongue is raised so the groove becomes a long tube from which water squirts in a line of drops.

Do fighting fishes fight?

Two male Siamese fighting fishes placed in the same aquarium instantly take up aggressive positions ready for a scrap. Their colours deepen, their long flowing fins become erect and they suddenly slash at one another at lightning speed. The fight is very dramatic and can last for up to an hour before one of the pair becomes too exhausted or injured to continue. The fight is such a spectacular sight that in Thailand contests are arranged before enthusiastic crowds and bets are placed on the outcome of the battle. For the aquarium market the fishes are bred for their beautiful flowing fins rather than for their fighting qualities. It is unwise to keep two males in a tank nevertheless.

What is dangerous about the scorpionfishes?

Their name may give you a clue as to why these fishes must be handled very carefully. These striking fishes are popular in marine aquariums. Drifting through the water with all their fins fully extended, they look wonderfully majestic. The fins are composed of long, separate spines and it is eighteen of these that are potentially very dangerous. The spines have poison glands and if you are unlucky enough to be pricked, venom is injected in to the wound, causing great pain for several hours.

Can frogs fly?

A species of treefrog from Malaya is even more adapted for scrambling and leaping after flying insects. This is Wallace's Treefrog and it has webbed feet with specially long fingers and toes. When the frog launches into a leap it stretches the fingers and toes wide apart, and the increase in surface area enables it to glide downwards for considerable distances. It does not fly so much as glide, but the advantage is that the frog can catch insects which it would otherwise be unable to reach by jumping normally.

What is the difference between frogs and toads?

Most people recoil in horror at seeing a toad in the garden. Toads are certainly more ugly than frogs. They have large flattened bodies with dry, wrinkled and pimply skins. The head of a toad is blunter than a frog's and its arms and legs are shorter.

The toad spends most of its time on land and it is a slow mover, unlike the active frog. It likes to establish a home for itself in some secluded spot to which it returns each evening after its leisurely feeding crawls. If you find a toad in your garden you might persuade it to stay by setting up a superior toad home - an old flowerpot is ideal. If it takes up residence your toad might stay for years. The flowers and vegetables should benefit by the toad's presence for it will feed on slugs, beetles and many other insect pests. It is often called the 'gardener's friend' for this reason. Don't worry about catching warts from your toad because this is just an 'old wives tale'.

When is a turtle a tortoise?

Turtles and tortoises form a large group of reptiles characterized by a heavily armoured shell. The protection this shell gives probably accounts for their survival, but it is not known exactly how this peculiar structure evolved.

Although the shell provides complete protection, it makes movement on land very slow and cumbersome, and most members of the group in fact live in the water. With the support of water the turtles have become good swimmers in both fresh and sea water. In America all members of this group are called turtles, whereas in Britain this name is reserved for those that live in the sea. Those that live in fresh water are usually called terrapins and those that live on land are called tortoises.

Are snakes really modified lizards?

Several features of the monitor lizards are not found in other lizards but are found in snakes. For example, the monitor lizards are the only lizards to swallow their prey whole, or if it is too big, pieces of it. Other lizards chew and crush their food before eating. Another snake-like characteristic is the monitor lizard's forked tongue, again unknown in other lizards. Finally, monitor lizards are unable to shed their tails, a typical lizard characteristic unknown in snakes. These clues indicate that monitors and snakes probably descended from the same ancestor way back in prehistoric time.

Other lizard families also have snake-like features and the burrowing skinks have long, streamlined bodies with reduced limbs. One lizard often mistaken for a snake is the Slow-worm. You can tell the Slow-worm is a legless lizard, however, by the several rows of scales along its belly (snakes have only one row), by the presence of eyelids (snakes have none), and by its notched tongue (snakes have forked tongues).

How does a snake swallow its prey?

Snakes catch live animals and eat them whole. They can swallow prey several times larger than their head. This is made possible by very loosely jointed jaws which enable the mouth to be opened wide. Backward pointing teeth grip the prey while the mouth is worked over the animal. Lots of saliva helps the meal to slip down the snake's throat.

Does a Boa Constrictor crush its prey?

The boas and pythons are gaint constricting snakes. Many people imagine this means they coil themselves around their prey, and squeeze and squeeze until the victim is crushed to death. This is, in fact, not so. A Boa constrictor, or any other boa or python, strikes at its prey with an open mouth. Backward-pointing teeth grip the animal while the snake quickly throws loops of its body around its prey. The snake may secure itself by coiling its tail around a fixed object, such as a tree, and then tightens two or three of the coils around its victim. This prevents the animal's ribs from moving so that it stops breathing and quickly suffocates. As soon as the victim ceases struggling the boa unwinds itself and starts to swallow it. Boa Constrictors eat reptiles, birds and small mammals.

How dangerous is the Adder?

Unless you are a young child, you need have no real fears about the effects of an adder bite. Adders are vipers and so have an efficient venom, but it is only really effective on small prey - lizards, mice and shrews. Adders rarely bite humans unless they are frightened by being trodden on or deliberately provoked. Many people try to kill them on sight but this is hardly necessary for they are actually quite useful in killing rodents. If someone is unlucky enough to be bitten, he may feel ill for a day or two but the chances are he will recover.

What animal can run fastest?

Would you believe that man, and an elephant, can actually run up to twenty-five miles an hour, if running for a very short distance? The race horse, traditionally a fast animal, can reach fifty miles an hour, and a greyhound up to thirty-five miles an hour. The fastest animals, however, are wild in the bush; the antelope and gazelle can run up to sixty-five miles an hour, for a run of a mile or so. The fastest animal is, of course, the cheetah or hunting leopard, which can run at a maximum speed of seventy miles an hour!

Where did Teddy Bears come from?

Teddy Bears began with the American President 'Teddy' Roosevelt, who was fond of hunting. One day he found a bear cub which had lost his mother and his kindness to the cub was noticed by a newspaper cartoonist. Afterwards Teddy Roosevelt went to a wedding and, at the reception, was given some toy bears. He was delighted and someone suggested they be called 'Teddy Bears', after Teddy Roosevelt. Soon toymakers were making a great many toy bears for children all over the world.

ABOUT OURSELVES

What causes a dimple?

To understand this, we should first realise that our skin is in two layers. There is the outer layer and the inner one which carries nerves and blood-vessels.

Beneath the skin is a loose layer of tissue which contains fibres that run in all directions. A few of these fibres are attached to the under-surface of the skin so that, although we can move the skin about very freely, there is a limit to this movement. Where there is a dimple, the number of fibres are increased and they are rather short. Therefore, their pull on the skin is greater and it is this which causes a dimple.

Why does a hair-cut not hurt?

All our senses are controlled by our nerves, which carry their messages to the brain. Therefore, any part of us that has nerves also has a sense of feeling. We might fall and cut ourselves, or have a tooth that aches. We are made well aware of pain because the damaged parts contain nerves. Our hair, however, does not contain nerves and so there can be no sense of hurt when it is being cut.

Why does water not soak into our skin?

Our skin is a true waterproof, for nothing can enter it from the out-side. Of course, it will allow water to come out in the form of sweat. Our skin contains millions of tiny tubes which carry sweat from the inner (true) skin to the finer skin on the surface of the body.

With the sweat glands exerting pressure upwards, water cannot make its way down into the skin and so this forms the perfect water-proofing.

How many hairs grow on the human head?

The number varies because some people have much thicker hair strands than others but the average number is 144,000.

How do we catch a cold?

Despite much research, nobody is completely certain why some people catch colds while others do not. Cold research clinics take volunteers in the hope of finding the cause and cure of the common cold but the strange thing is that while some of the volunteers do catch cold, others simply do not become infected. Their natural resistance to the cold germ is so great.

Why is sea air good for us?

Because it is purer and fresher than air which blows overland. There are few, if any, particles of dust and dirt in sea air and this enables the health-giving rays of the sun to reach us more freely and powerfully. Sea air also contains vital salts and traces of iodine.

Is soap and water good for the skin?

Yes. On all normal skin, good soap cleanses by combining with water to make a lather which penetrates the pores and roots out the dirt. Perfumed soaps can, however, cause allergies. Soap is made of fats and alkalis and the best soap contains rather less alkali and has special antiseptics which help to rid the skin of harmful bacteria. Good soap will not injure delicate skin.

What is heart-burn?

There are times when the stomach is upset and we get a burning feeling in the chest and throat. This is what we call heart-burn. It is a form of indigestion. It could be due to eating foods that do not agree with us, or which we have not digested properly. As a result too much acid is formed in the stomach and this causes the burning sensation.

Why do we get electricity in our hair?

When we comb our hair it sometimes happens that we can hear faint crackling. The reason is that combing can create a little electricity. Electrons are taken from the atoms of the comb and are added to other atoms of the hair. It is this passing of the electrons which creates electricity.

Why do some people walk and talk in their sleep?

Our mind controls our actions and movement; yet while there are acts we are aware of doing, there are others performed without our knowledge.

We breathe, walk, sit, stand and so on without really being aware of doing so, because these acts are so natural that we do not have to think about them.

Sometimes it happens that some of these movements may be carried out by a person who is asleep. This is because while one part of the mind is at rest, the other part is active.

It is this wakeful part of the mind which has an effect on sleep. The acts of walking and talking are so commonplace that the mind does not need to be *aware* of doing them. That is why, in disturbed sleep, some people walk and talk.

Why do our faces turn red when we do something wrong?

When our faces turn red because of some act that we know to be wrong, it is probably because we are ashamed. Another reason for blushing, as it is called, may well be from anger or shyness.

All these emotions disturb the nervous system which controls the flow of blood to the surface of the skin and it is then that our faces flush.

How do "goose pimples" form?

This is another term for goose-flesh, because cold or fear causes the skin to look like that of a plucked goose. What happens is that when we are cold or receive a fright or shock, nerves which control the tiny muscles at the roots of the hair are disturbed.

As a result, these muscles cause the hair to stand on end and produce the effect we call "goose-pimples". It is a very faint trace of a reaction seen best in cats when their fur stands on end if they are angry or scared.

Why don't we laugh when we tickle ourselves?

When we are tickled, we laugh and wriggle. This is what is termed a reflex action, an action which takes place without any thought on our part.

Balancing ourselves when we walk is another example of reflex action.

We retain our balance automatically, without thinking about it, but when we try to tickle ourselves, the brain knows that we are going to do it and so there is no reflex action.

Millions of people wear spectacles but how did they develop?

Although some Ancient Roman writers made reference to eyeglasses of beryl gemstone worn by the Emperor Nero, the earliest framed lenses to correct defects in vision were made in China in the 10th century. They did not appear in Europe until the later 13th century and are first recorded in Britain in 1326.

These early spectacles were held in the hand or perched on the bridge of the nose. Rigid arms to connect with the ears and fasten the lenses were invented by Edward Scarlett, a British optician, in 1724.

The manufacture of spectacles then increased greatly and the quality of the lenses used also improved.

Why does hair turn grey?

The colour of our hair depends on the amount of pigment (colouring matter) in it. Dark hair contains more of it than fair hair. This colouring matter is produced in our bodies and is controlled by the nervous system. If anything goes wrong with this control through illness but more often by wearing out in old age, then the hair turns grey or white.

What is more important in keeping us alive, food or water?

Water. We can live for some weeks without food but only a few days without water.

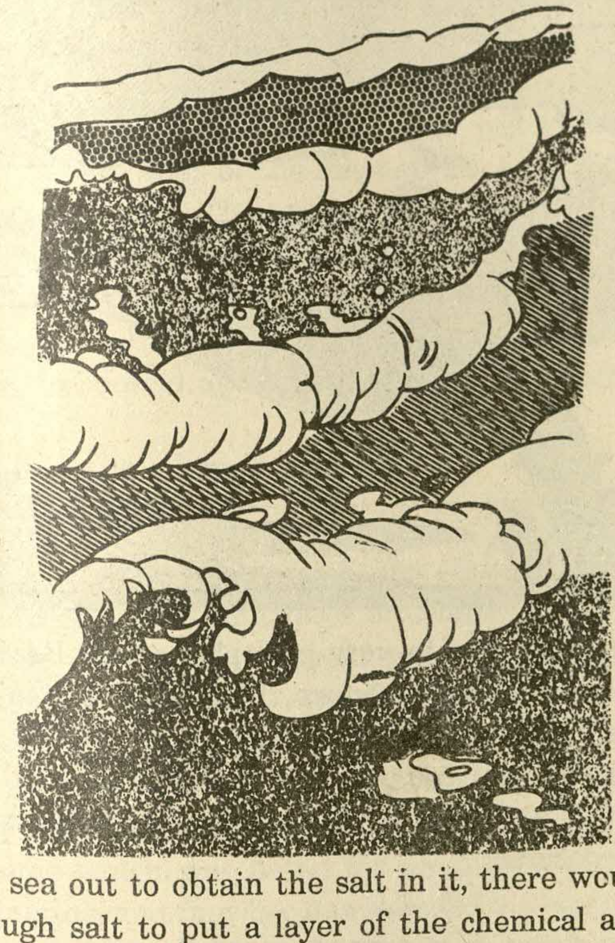
Why don't men have tails?

All species of animals, including man, of course, have developed very gradually over millions and millions of years. In this way, each animal strengthens and improves those parts of its body which are particularly useful, and the various parts which are not so useful diminish or are adapted. This evolution happens very, very slowly, and changes can only be seen over numerous generations. In four-legged animals, or quadrupeds as they are called, the tail is very important for balance, and in many cases it is used almost as another limb, for instance when monkeys swing through the trees. Man, however, walks on two legs - he is called a biped - and he does not need the tail for balance. As a matter of fact, a small very rudimentary 'tail' can be found at the base of our spines, but it does not help us at all with balance or movement.

THE WORLD AROUND US

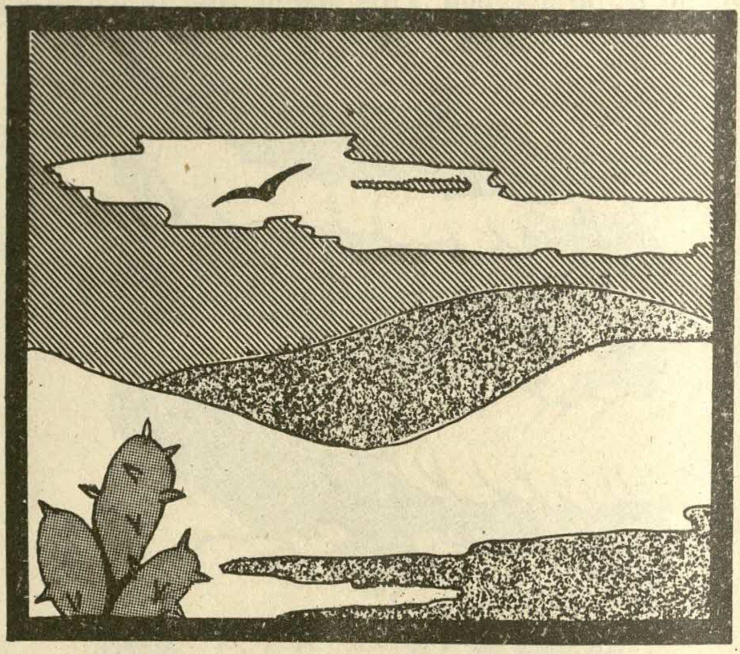
How much salt is there in the sea?

Every gallon of sea water has about four ounces of salt in it, on average. This means that if you dried the sea out to obtain the salt in it, there would be enough salt to put a layer of the chemical around the world 147 feet thick!



Are all deserts hot?

The definition of a deserts is a place where the lack of moisture makes it impossible for anything but a few special life forms to grow. This applies not only to hot places, like the Sahara and the Gobi deserts, but also to very cold places too. Because all or most of the moisture there is turned to ice, almost nothing can grow there, which makes it a desert. So, you see, a great deal of the Arctic is desert as well as the hot places people think of as being deserts.



How does a magnet work?

When you bring a magnet close to another metal object such as a nail, the nail will be attracted towards it. This power of attraction is created by lines of force which surround the magnet. They cannot be seen, but if you place a thin sheet of paper over a magnet, and scatter iron filings on the upper side of the paper, the filings will fall into place according to the lines of force. They will reveal what is known as a magnetic field.

Most of the filings on the paper will be attracted to the two ends of the magnet. These ends are the magnet's poles. The earth itself is like a giant magnet, with its opposite ends at the North and South Poles. This is why the metal needle of a compass will swing round until it is in line with the earth's magnetic field and points towards the North Pole.

Who are the Cossacks?

Many hundreds of years ago, Russia was full of different tribes and races of people who had made their way from the great plains, or steppes; and mountain ranges of Asia. One of these races - the Cossacks -settled along the banks of the River Don which flows into the Sea of Azov, near the Black Sea. At the same time, they bred a special kind of horse which was noted for its great strength and stamina, and they became splendid horsemen. Their reputation as riders and warriors grew over the years, and they came to be looked upon as some of the finest cavalry soldiers in the world.

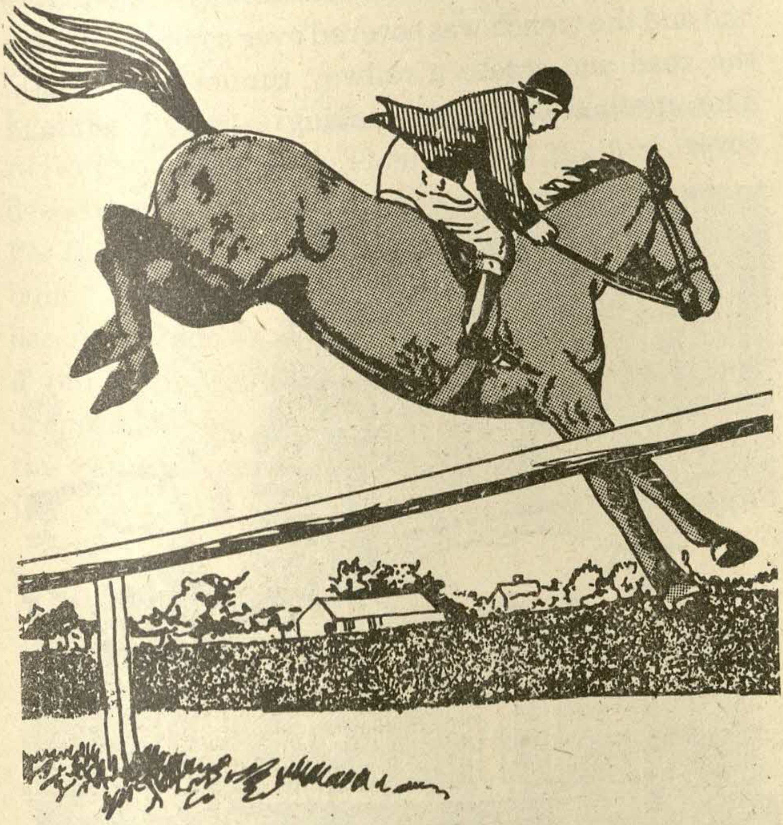
Sometimes the former Russian rulers, the tsars, used the Cossack cavalry to crush rebellions among the peasants. At other times the cossacks were the pride of the Russian army, and could always be relied upon to strike fear into the hearts of the enemy. They were especially effective during Napoleon's invasion of Russia in 1812, attacking his lines of communication and pursuing his armies during the terrible winter retreat. The German army also came to fear the Cossacks regiments during the Second World War.

Today the Cossacks are as famous as ever. They give exciting riding displays. They have also formed a choir which gives concerts all over the world.

What is show-jumping?

Show-jumping is a competition to see which horse and rider can best jump a series of walls, fences and other obstacles. Points are won and lost as the horses, one after the other, attempt each obstacle on a specially prepared course. Sometimes extra points are awarded to the horse which completes the course successfully in the fastest time.

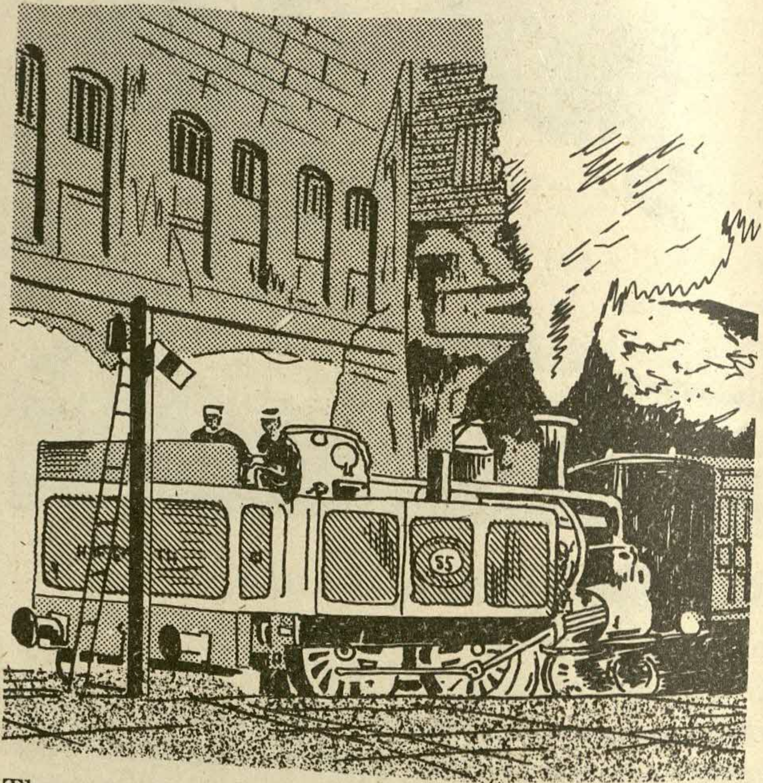
Some of the special walls on a show-jumping course are made of bricks, and if the horse kicks any of the bricks off the wall as it goes over the top it will lose its rider points. Fences are often made of wooden poles, and again, none of the poles must be kicked out of place by the horse if its rider is to score full points. Also, there are often ditches filled with water, which the horses must be able to clear. If a horse refuses to jump a fence, it will mean a serious loss of points. And if a horse throws its rider out of the saddle, this is worse still.



Show-jumping is popular with millions of people today who can see such contests on television. Some show-jumping horse riders are now as famous as racing jockeys.

Where is the world's oldest underground railway?

The first city to build an underground railway was London. Once the route was planned, a great trench was cut along the streets, the railway tracks were laid and the trench was covered over again, to restore the road and create a railway tunnel underneath. This method of tunnel making is called 'cut and cover'.



The original route of the London Underground was nearly four miles long and ran from Paddington

Station to Farringdon Street in the City of London. It was opened in 1863. The first trains were hauled by steam engines, and the smoke in the tunnels made the journey very unpleasant. But as the world's first underground railway it was a cause of great excitement and regularly carried 30,000 passengers a day.

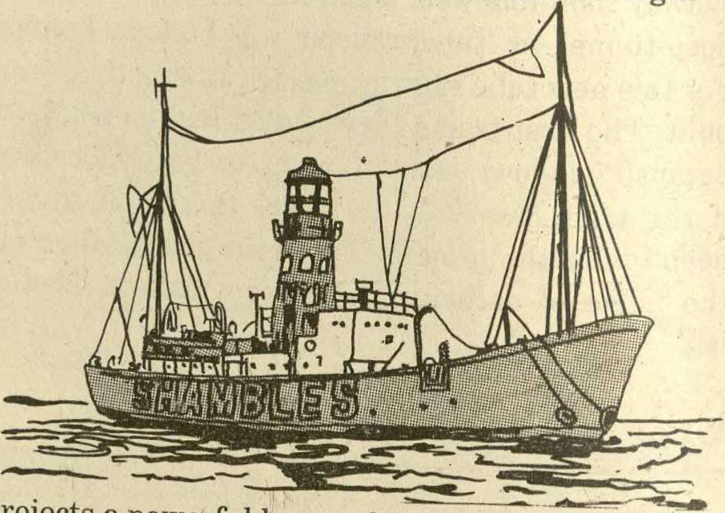
Further sections of steam operated underground railway soon followed. Then in 1890 the first really deep-tunnel, or 'tube' railway was built in London. For this new tube railway, electric locomotives were built. The first trains they hauled had no windows, because windows were thought to be unnecessary if the train was only to travel through a tunnel deep under the ground. The train guard called out the name of each station as the train arrived at it.

What is an aviary?

An aviary is a house or very large cage for birds. For thousands of years, birds have been kept in aviaries to be enjoyed for their beautiful plumage or to be sold as pets. In the great markets and bazaars of India, whole buildings, resembling palaces, were built as aviaries. Most zoos have an aviary, which is often a large, glass domed building, built so that the birds have plenty of light and space to fly about in. A small aviary can be quite easily built on to a simple garden shed by removing some of the wooden wall and fitting wire netting, or by adding to the shed a framework of wood or metal covered with netting.

What is a lightship?

A lightship is like a floating lighthouse. It anchors in one spot to warn shipping of such nearby dangers as sand banks or dangerous currents. At night it projects a powerful beam of light. The lamp is fitted in such a way that the beam stays steady, even if the ship is being tossed about by waves. Lightships also have their name painted on each side, so that during daylight hours ships can use them to check their own position.



Who are the Bedouins?

The Bedouins are a nomadic Arab tribe whose name is derived from *badawi* meaning 'desert-dweller' They make up about one-tenth of the population of the Middle East, but cover in their wanderings nearly nine-tenths of its land area. Their pattern of life is determined by the grazing needs of their flocks which they follow all the year round, living in black goats' hair tents. Traditionally they despise agricultural or manual work, and are happiest tending their herds of sheep, camels and highly-bred horses.

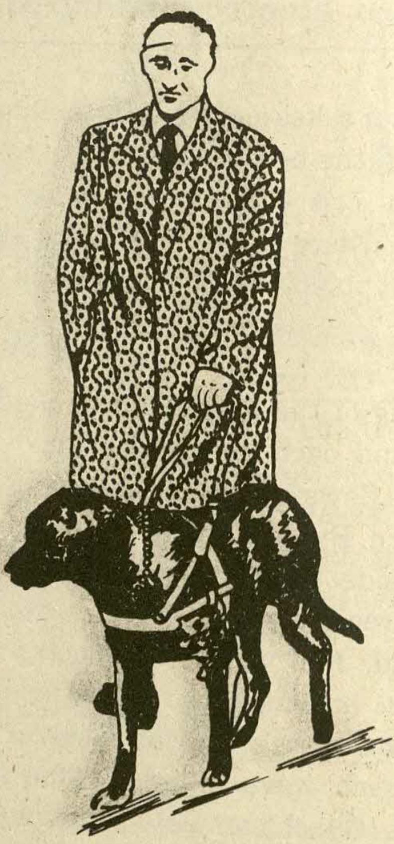
What is an electrocardiograph?

When a doctor takes a pulse he is feeling the patient's heart-beat. If the heart is beating faster than normal it may be a sign - like a rise in temperature - of illness somewhere in the body. For signs of illness in the heart itself a more careful check is usually needed.

The working of the heart is controlled by electrical impulses, and each part of it - the various valves where blood flows in a out - produces its own electrical wave pattern. By attaching electrical terminal points to the outside of the chest and connecting these to an electrocardiograph, these wave patterns can be observed. For when the electrocardiograph is switched on, an automatic device like a pen moves up and down over a special sheet of graph paper, recording each wave impulse. This shows exactly the pattern of each complete heart beat. If anything is wrong with the heart, it will be shown by irregularities in these patterns. The pattern sheets, or electrocardiograms, can then be kept by doctors and compared over a period of time, which is extremely useful in the treatment of heart illness.

What do guide-dogs do?

Dogs are what we call domesticated animals, meaning that for thousands of years they have played a very close and important part in men's lives. One of the



most valuable jobs a dog can be trained for is to act as a guide-dog. These dogs are owned by blind people and lead the way when they want to go out. Such dogs are selected for this job when they are about two years old, and it takes four or five months to train them. They are trained to lead their blind master down a street so that he won't bump into other people or walk into building or lamp posts. They are also taught to stop at the curb and not lead their master across the road until the trafic has stopped or is a safe distance away. As they are highly intelligent animals, they can even help their masters safely in and out of buses and trains.

How do our lungs work?

Our lungs are like two spongy bags. Just as a sponge can be filled with water and then squeezed dry again, so our lungs fill with air when we breathe in and then release most of the air again when we breathe out. As air enters the lungs it passes down a series of smaller and smaller tubes, which are known as the bronchial tubes, until it ends up in thousands of tiny air sacs. At this point oxygen from the air passes through the lining of the lung and into the blood. This oxygen is vital to the blood stream, as it helps to carry food energy to every other part of the body. Oxygen passes into the blood stream through the lungs, and so, in a similar way, waste products, such as carbon dioxide, pass out of the blood and are removed from the body as we breathe out again.

How is paper made?

Paper is made from wood, and many of the world's paper mills are found in those countries which have great forests - Canada, Sweden and Finland.

The newly cut trees are usually stripped of their bark, branches and foliage where they have fallen, so that by the time they arrive at the paper mill they are ready for processing. The tree trunks are first cut into thin strips, mixed with water, and ground to a heavy, sticky pulp. This wood pulp is then cleaned of dirt and other impurities, and also chemically bleached to remove the original brownish colour of the wood. The cleaned and bleached pulp next passes through special kinds of rollers which flatten it and draw it out until, at last, it begins to look like sheets of rather soggy paper. These sheets are finally dried and refined until the finished paper is produced.

High quality paper is further 'coated' with clay and other materials to give it a specially smooth, white surface.

How fast can a dog run?

Some breeds of dog can run much faster than others, and the fastest dog of all is the greyhound. A fully grown greyhound can run at the astonishing speed of about 56 k.p.h., that is, at nearly a kilometre a minute.

Because greyhounds runs so fast, greyhound racing is a popular sport. At a greyhound racing track, the dogs are put in a series of boxes called traps. Then an electrically-driven imitation hare starts to move round a rail running beside the track. As the hare runs past the traps, the doors are released and in their excitement the dogs rush out in pursuit. As in horse racing, people place bets on which dog will be first past the winning post.

Why is the British flag called the 'Union Jack'?

The Union Jack, the official flag of Britain since 1801, is really three separate flags in one, for it combines the English cross of St George, the Scottish cross of St Andrew and the Irish cross of St Patrick. England, Scotland and Ireland were originally independent countries, and the Union Jack symbolizes the fact that they now form the United Kingdom, another name for Britain. Although generally known as the Union Jack, this is incorrect because it is the term for a flag flown only from the jack staff in the bows of a ship to indicate it is a man-of-war. Through popular use, however, the Union Jack has become the accepted name for the flag.

What do charts tell us?

Charts are maps of the sea. As maps show distances, roads and railways, hills and woods and many other features of the land, so charts show distances over stretches of sea, the depth of the water round coasts, dangers to shipping such as rocks and sand banks, tidal currents, the positions of lighthouses, marker buoys and other information vital to a sailor.

Charts are essential to the navigation of a ship. The navigator is the man who must plot the course of the ship, know exactly where the ship is and which direction she is travelling in, at every stage of the voyage. One of the most important items connected with charts is the compass rose, which shows all the principal points of the compass. A navigator needs this in order to relate his chart to the North Pole and so check the direction of the ship's course. Another important item is a set of compasses, or dividers. With these the navigator can measure off distances from the chart, so that he can then calculate how fast his ship is moving and how long a voyage will last.

Special charts for yachtsmen include extra, useful information. Such charts will indicate which courses to follow if the yacht is under sail, and which stretches of water along the coast are safe and suitable anchorages.

Where is the Pampa?

The Pampa is a region of grassland in Argentina. It runs inland from the towns and cities, such as Buenos Aires on the Atlantic coast, and stretches for hundreds of miles up to the foothills of the Andes. The Pampa is very like the great plains, or prairies, of North America which stretch across the states of Texas, Kansas and Nebraska. Like the prairies, the Pampa is most famous for its cattle ranches, and the cowboys which look after the herds of cattle as they roam across the plains. One of Argentina's most important exports is beef, which comes from the huge cattle ranches which are situated on the Pampa.

When did the first electric train appear?

The world's first electric locomotive was designed by the German scientist Werner von Siemens. It was shown at an international trade exhibition in Berlin in 1879. A special track was built for the locomotive, which hauled up to thirty visitors at a time around the exhibition. One of earliest electric railways, in England was Volk's Electric Railway, built along the sea-front at Brighton. This railway was opened in 1883. It was a marvellous holiday attraction at that time, and is still very popular with visitors to the seaside town. The first electric trains to be used as a serious means of transport appeared on the London Underground in 1890, and the building of longer distance electric railway began after the First World War.

What is a rack railway?

Ordinary railway lines usually look as though they are laid on level ground. In reality most stretches of railway track have a slight gradient, so that during a journey of any reasonable length, a train will be running up and down a number of very gradual slopes. However, there is a definite limit to the degree of steepness a train can manage going up hill before its wheels start to skid on the tracks. In mountainous areas especially, it is not always possible to avoid gradients which a normal train simply could not climb, even by carrying the track through deep cuttings and tunnels. To overcome this difficulty rack railways have been built. Locomotives intended to run over such sections of track have a toothed, or cog, wheel fitted between the normal running wheels. This connects with a third rail, also toothed, fitted to the track itself. This is the rack rail. When the locomotive runs along the track, its cog wheel engages the rack rail and so holds the train to the track with no risk of skidding.

Some rack railway lines pass through mountainous regions such as Alps. Others have been built to carry passengers to the actual summits of mountains, such as Snowdon in North Wales, and Mount Washington and Pike's Peak in the United States.

What is our skin made of?

The surface of every part of the body, inside and out, is covered with a protective layer, or layers, of tightly packed cells called epithelia. The largest, thickest and most complex of these epithelial tissues is the skin which covers the whole of the outside of the body. The skin itself is made of two principal layers. The outer layer - the part of the skin we actually see - is called the epidermis. The softer, more delicate inner layer is the dermis.

It is in the dermis that the roots of the hair are contained. In other mammals the hair is farmore important than in man. It helps to regulate the heat of the body. In cold conditions the skin tightens. This raises the hair from the surface of the skin and creates an insulating layer of air which helps the body to reatin its heat. In cold weather our own skin still behaves in the same instinctive way and we experience what is known as 'goose flesh', or 'goose pimples'.

When the body needs to lose heat rather than retain it the sweat glands start to function. Sweat is largely water, and as it comes to the surface of the skin through the sweat glands it carries with it excess body heat which then evaporates into the surrounding air, thus acting as a method of cooling.

Can trains run without rails?

For many years railway engineers have been thinking about new kinds of track for trains to run along. The parallel metal rail tracks with which we are familiar are not very efficient by modern standards. Because wheels are needed to move the trains along, a good deal of power is lost through friction in the moving parts. Ordinary railway tracks also set a limit to the speed that trains can go, especially round curves. They take up a lot of room, and they are expensive to build and keep in good repair.

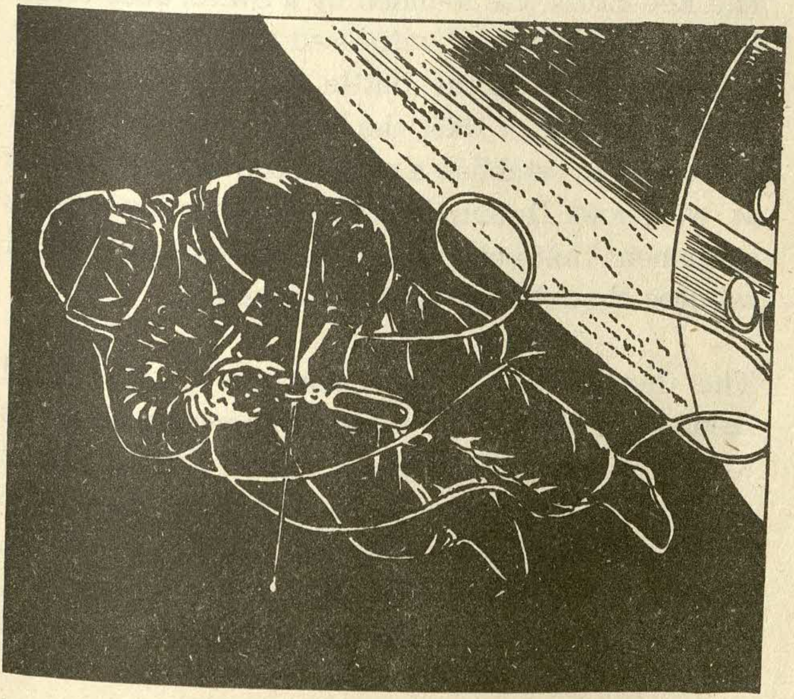
Some trains, such as those operated on the Paris Metro, run verv effeciently on rubber tyres. Other even more interesting advances in this field have been the experiments with monorail systems. Monorail means 'one rail', and several types of train have been designed which are suspended from an elevated monorail track. Spectacular results, in terms of speed and comfort, have been achieved.

Yet other trains have been built which sit astride a single metal or concrete track and slide along it. Called aerotrains, they have been designed to move like hovercraft. Their weight keeps them safely close to the rail or track, but they can glide along a 'cushion of air'. An even more advanced idea is to suspend a train from a monorail by magnetizing the rail. In all these cases there is hardly any friction to overcome, and much greater safety.

New forms of motive power are also being considered, including jet propulsion. The day may come when trains will be able to move almost as fast as aircraft.

How do astronauts 'walk' in space?

If an astronaut leaves his spacecraft during a journey, he cannot walk about in the ordinary way. There is nothing but empty space. There is not even any gravity to pull him in one particular direction. He



can only guide himself by the same means as the spacecraft itself - by rocket propulsion. So when astronauts do leave their spacecraft during a flight - perhaps to help in docking operations with another spacecraft - they carry specially designed hand rockets with them. If they point the rocket exhaust in one direction, and give the engine a burst of power, they will move in the opposite direction. In this way they can steer themselves.

Who founded the Red Cross?

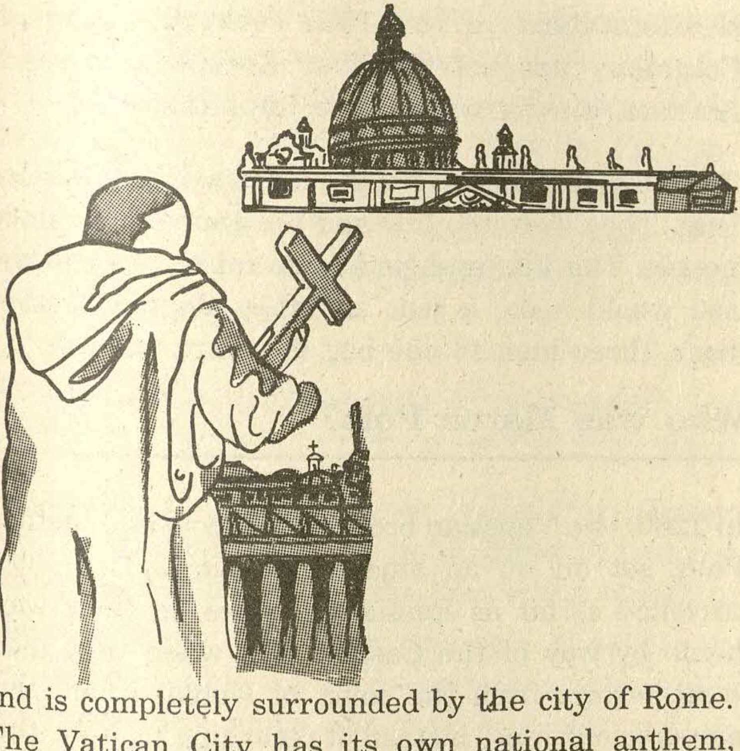
The Red Cross was founded by a Swiss, Jean Henri Dunant, after he had witnessed the terrible plight of the wounded at the Battle of Solferino in 1859. Five years later, in 1864, the first Geneva convention was called to establish a code of conduct for nations at war, and Dunant obtained the convention's agreement that both wounded soldiers and medical services should be treated as neutrals.

The flag chosen to represent the international medical service that grew out of Dunant's work was a red cross on a white background, this being the reverse colours of the Swiss flag. It also gave the organization its name. In Moslem countries, however, the flag is a red crescent on a white background, to distinguish it clearly from the Christian symbol of a crucifix.

EXPLORATION AND DISCOVERY

What is the smallest country in the world?

The smallest country in the world is the Vatican City, which is less than one square mile in area,



and is completely surrounded by the city of Rome. The Vatican City has its own national anthem, stamps, newspaper and radio station, and has a population of just under a thousand people.

Who discovered America?

Christopher Columbus discovered America in 1492, but his ships were not the first from Europe to reach North American coasts. It is possible that Irish monks, or a Welsh prince, had crossed the Atlantic centuries before. Their voyages, if they ever took place at all, had been forgotten, and so had the voyages of the Vikings, who had settled first in Iceland, then in Greenland and finally in Newfoundland in the 10th century. Although Columbus was not the first European to reach America, his discovery is the important one.

The Vikings colony in North America did not survive long. They were too few and the Indians remained hostile. The Viking ships had no cabins, though the sail would make a tent and they slept in leather bags, three men to one bag for extra warmth.

Who was Marco Polo?

In 1260, two Venetian brothers, Niccolo and Maffeo Polo, set off on an amazing journey. They had travelled as far as Russia and were on their way home by way of the Caspian Sea when they met some envoys from the court of Kublai Khan, the emperor of China. Instead of returning to Italy, the two brothers decided to accompany the envoys to the Khan's palace in Peking. They were well received and did not return to Venice until 1269.

Two years later they set out for the Khan's court once more. This time Marco, Niccolo's 17-years old son, travelled with them. The three went on and on, across arid deserts and over high mountains and finally arrived in Peking. The Khan was greatly taken by young Marco and began to send him on special missions throughout his vast empire. Marco served the Khan for seventeen years and kept detailed notes of everything he saw. He visited nearly every part of the Chinese empire about which Europeans knew very little. He finally returned home at the age of forty-one and wrote a book about his strange and wonderful adventures. Unfortunately the Italians, who had no idea of what the Far East was like, mistrusted his book and believed it to be full of lies. It was not until many years after his death that other explorers confirmed the truth of what Marco had written.

Why did Columbus sail westwards?

Christopher Columbus was an Italian from Genoa living in Portugal. Although in the fifteenth century most people still believed that the world was flat, others, including Columbus, had come to believe it was round. If this was so,he argued, a ship could sail around the globe and return to its original starting point. Thus the shortest route to the Spice Islands of the East Indies would be by sailing *westwards*. He sought support for his theory but it was rejected again and again. Finally, after years of disappointment, he gained the help of Ferdinand and Isabella, the king and queen of Spain. In August 1492, three small ships set sail from Spain, their bows pointing westwards across the wide, unknown

Atlantic. They were the *Santa Maria*, the *Nina* and the *Pinta*. On 12 October land was sighted. Columbus was convinced that it was an island off the coast of India. When other islands came into view he named them the 'Indies'. His 'mistake' was nevertheless a vitally important event in the discovery and exploration of the West.

Which Europeans first landed in Australia?

During the sixteenth century, the Portuguese were the principal traders in the East Indies. By 1600, however, their place had been taken by the Dutch who, sailing via the Cape of Good Hope, set up a powerful base on the island of Batavia. Soon their ships were seeking new lands in order to open up more trade. In 1606 a Dutch ship called the *Duyfken*, 'the Dove', anchored off northern Australia and some of the crew went ashore - the first Europeans to do so. They were refilling their water casks when they were driven off by fierce natives. The *Duyfken* sailed away again without exploring any other part of the vast Australian continent.

Who was the first explorer known by name?

Herodotus, the Greek historian of the fifth century B.C., tells in his History of an expedition made by

Phoenicians at the order of the Egyptian pharaoh, Necho. He mentions its importance but fails to give the names of any of those who took part. About a century later another expedition set sail under a Phoenician called Hanno, and one of its members wrote an exciting account of the voyage.

The journey began about 500 B.C., when Hanno sailed from his home in Carthage as the leader of a fleet of nearly 70 galleys carrying 30,000 men and women. The object of the expedition was to set up new colonies along the west coast of Africa. The fleet sailed westwards through the Straits of Gibraltar, into the Atlantic, and then turned southwards. A number of colonies were formed, but often attempts to land on the African coast were unsuccessful, for the would-be settlers were met by 'wild men, clad in the skins of beasts who cast stones and drove us off, preventing us from landing' They sailed on, recording many strange sights including a huge 'mountain of fire', possibly Mount Cameroon, and also fierce, shaggy-haired creatures which interpreters on board their ships called 'Gorillas'. Supplies ran low as Hanno's fleet neared the Equator and he was forced to turn and head for home.

Who discovered Newfoundland?

John Cabot was an Italian and a native of Venice. When he sailed westwards in the little *Matthew*, in 1497, however, he flew the banner of St George at his masthead, for he had been sent on a voyage of discovery by England's King Henry VII. After a crossing of six weeks, land was sighted. Cabot went ashore to claim what he called 'Prima Vista' - 'First Seen' - for England. it later became known as Nova Scotia. He then sailed northwards along the southern coast of 'New Found Land' naming capes, bays and islands as he went. He was particularly impressed by how rich the seas were in salmon, sole ('about a yard in length') and cod. He returned to England on 6 August to a great welcome and a gift of £10 from the not over-generous king.

Why is the Cape of Good Hope so called?

In 1486, Bartholomew Diaz, a Portuguese nobleman set sail from Lisbon, determined to follow the African coast further than anyone had before. After he had passed the mouth of the Congo (now Zaire) River, a fierce storm sent his ship reeling out to sea. When the gales had blown themselves out, he tacked back to the coast and found to his surprise that it now lay to the *west*. The storm had blown his ship right around the Cape. On his return to Portugal, Diaz told King John II that he had named the great promontory the 'Cape of Storms'. But the king, realizing this discovery might open a route to greater wealth, suggested that it be renamed the Cape of Good Hope.

Who was the first explorer of the Sahara?

In 1822, Hugh Clapperton, a young naval lieutenant, agreed to go with Walter Oudney and Dixon Denham to try and discover the source of the River Niger in North Africa. They journeyed south across the Sahara from Tripoli to Lake chad, the first white men to visit the region. Oudney died at Murner, and the other two separated, Clapperton going on alone to Kano, a great trading city west of Lake Chad. He then travelled to Sokoto, where he became friendly with the sultan who ruled the vast area, returning to meet up with Denham again in Kuka. Having established that none of the rivers flowing into Lake Chad was associated with the Niger, Clapperton returned to England and wrote a book of his adventures. In order to solve the problem of the Niger he returned to Africa in 1825, and set out on another journey starting from the Bight of Benin. Nine months later Clapperton arrived in Sokoto, where his detention by the sultan, added to the hardships of the journey, so affected his health that he died soon afterwards, at the age of thirty-nine, and was buried outside the walls of Sokoto.

Why is the Amazon River so called?

In 1539 a large Spanish force set out from the town of Quito, in Ecuador, to find out what could be discovered to the east. As their supplies were running out, Gonzalo Pizarro, a brother of the conqueror of Peru, ordered a small party to retrace their route by boat and return with fresh supplies. Commanded by Francisco de Orellana, the fifty men set off. However, a strong current swung their boat around, forcing them eastwards in the opposite direction. After several exhausting days, Orellana decided to let the current carry them where it would. Luckily they soon reached a village where they found food. Setting off again, the strong current carried them past hot, steamy jungles where trees fringed the water's edge. On one occasion they were attacked by more than 2,000 natives and had to fight them off,using cross-bows, for their powder was damp. Shortly after they met a fleet of canoes filled with tall, fair-haired women who shot arrows at them, killing seven of their number. Because of this incident, Orellana called the river the 'Amazon' after a race of legendary women warriors. Finally, after a voyage of nearly 4,000 miles, they came at last to the Atlantic Ocean-the first men to cross south America at its widest part.

Who was Australia's most famous explorer?

In 1800, Matthew Flinders was a young naval lieutenant with a passion for exploring. He sailed around the Australian coast with a friend called George Bass in a small boat they named 'Tom

Thumb'. Once, on going ashore, they were menaced by hostile natives but Flinders won them over by trimming their hair and beards! Later, in 1801, flinders sailed in HMS *Investigator*, sounding and charting the Australian coast and filling in many of the gaps left by Captain Cook. Eventually his ship became unseaworthy and had to be broken up, so the crew was divided between HMS *Porpoise* and the *Cato*. The ships sailed for Sydney but both were wrecked on a reef off the coast of Queensland. Only three men were drowned and the remainder were rescued after two months' existence on a small sandbank. On his return to England, Flinders wrote *A Voyage to Terra Australis* which became a classic of exploration.

How did the Sturt Desert get its name?

The first explorer to venture deep into the barren heart of Australia was an Englishman, Charles Sturt. He was an army captain when, in 1826, he was sent to new South Wales with a shipload of convicts. He became military secretary to the governor, but his real interest lay in leading expeditions into the interior, during which he discovered and named the Darling and Murray Rivers. In 1844, he set out with fifteen men in an attempt to reach an island sea which he believed, mistakenly, lay at the centre of the continent. He fought against terrible hardships but was defeated at last by the impassable stony desert which now bears his name.

Who discovered the Mississippi River?

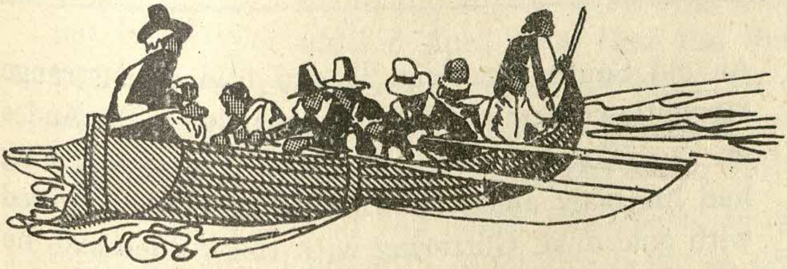
One of the many who went on a vain search for EI Dorado was a Spaniard, Hernando de Soto. He set off with a few mounted companions from florida in 1539 on a journey that was to last for three years. De Soto and his party pushed their way through unexplored territory and in 1541 came to the banks of a huge river, the longest in the world, which the Indian called the 'Mississippi'. A year later De Sotoa died, wounded in a skirmish with Indian on the banks of the river he had discovered.

Who discovered the source of the Nile?

For thousands of years the world had speculated about the origin of the River Nile, but it was not until Richard Burton and John Hanning Speke, two experienced explorers, led an expedition to Africa in 1857 that a real attempt was made to solve the problem. The entire journey was complicated from the start by the fact that neither of the two men could stand each other, and argued violently the whole time. They both became extremely ill, and the expedition achieved little more than the discovery of Lake Tanganyika. On the return journey, Speke reached Lake Victoria which he thought might be the source of the Nile, although Burton strongly disargreed. In 1860 Speke set out on another expedition, this time with James Grant. They followed the previous route as far as Tabora, but from there headed towards the country west of Lake Victoria. Continuing around the lake, Speke finally reached the Ripon Falls (1860), at which point he was certain that he had found the source of the Nile, and indeed his theory was proved right.

Who were the Pilgrim Fathers?

In Tudor times a number of Puritans lived in Lincolnshire in England, where they were often badly treated because of their faith. At last they could stand the situation no longer. They decided to sail for Holland where other Puritans had already settled. Living in Amsterdam to start with, they moved to Leyden where they were warmly received by the friendly Dutch. They never forgot that they were English, however, and finally came to a great decision. They would sail to England's settlement in North America where they would have freedom to worship as they wished. About thirty-five of them arrived



in England and with sixty-seven others - men, women and children - they sailed from Plymouth in 1620 in the *Mayflower*. After a voyage of two months during which the ship was blown off course, they anchored in Cape Cod Bay, Massachusetts. They had hoped to settle in Virginia but their captain would not take them further. Some of the men went ashore to search for a suitable place for a settlement and found one with plenty of wood and water. They named it Plymouth because that city had been their last link with the Old World. Their first winter was a hard one and by the spring of 1621 half of them had died. Even so, none wanted to return to England. Things slowly improved, especially when they made friends with their Indian neighbours. Other people joined them from England and the colony set an example of faith and courage to all future settlers who, in time, were to become Americans.

What was 'El Dorado'?

An old South American legend told of a strange coronation ceremony. It took place high in the Andes on the shore of Lake Guatavita. Every new king had his body anointed with oil and then covered with gold dust. Glittering with this golden skin he plunged into the lake whilst his subjects cast in further gold and jewels as offerings to their god. When this legend reached the first Spanish settlers they called the king 'El Dorado' - The Gilded Man

- and the city, Monoa. With this knowledge came a great desire to find the legendary king and his golden city. Many expeditions were undertaken in search of fabulous treasure, but all, in fact, failed. One of the first expeditions was headed by Gonzalo de Quesada who, in 1569, led an army of eight hundred men into the remote fastnesses of the Andes. After a year of incredible difficulties Quesada reached a city where he discovered a certain amount of gold and silver articles, a relatively small prize for all the hardships he and his men had endured. This city was named New Granada (now Bogota). Others after him continued the search for EI Dorado and many died in the attempt. Sir Walter Raleigh led two expeditons from England, both of which were unsuccessful.

Who first reached the North and South Poles?

Men began to explore the Arctic as early as 1553, but it was not until 6 April 1909 that the Pole itself was reached. Three and a half centuries of effort and courage ended with an American, Robert E. Peary 'nailing the Stars and Stripes to the North Pole'. The quest for the south Pole began much later, the first landing in Antarctica being as late as 1895. In 1910 a Norwegian, Roald Amundsen, sailed for the Arctic in Nansen's ship the *Fram*. Hardly had he started, however, than he heard of Peary's success. He at once put his ship about and sailed south. On 20 October 1911, from his base in the Antarctic, he set off for the South Pole. The going was difficult; fog and blizzards slowed the men down. They reached their goal on 14 December and raised the Norwegian flag over the estimated position of the Pole. It was still flying when a month later Captain Robert Scott arrived with four other Englishmen, only to discover thet they had been beaten by Amundsen. On their return to base, Scott and his men perished in a blizzard.

Who first reached the Poles by aircraft?

As early as 1897, the first attempt was made to reach the North Pole by aircraft, when a Swedish explorer and three others set off in a balloon. Thirty years later their bodies were found near where the balloon had crashed. By then the North Pole had been crossed by a three-engined Fokker monoplane, the *Josephine Ford*. It carried Lt. Commander (later Rear-Admiral) R.E. Byrd with floyd Bennett as pilot. The plane left spitsbergen on 8 May 1926 and after twice circling around the Pole, returned to base after having flown 2,500 km. Four days later on 12 May, the Pole was crossed again, this time by an airship, the *Norge*, commanded by the veteran explorer, Roald Amundsen. A year later an airship, the *Italia*, crashed on yet another Arctic flight and whilst searching for survivors Amundsen lost his life. In 1927 Byrd set up a base at Little America in the Antarctic. He was now ready to set out on an attempt to cross the South Pole. From four aircraft available he selected a three-engined Ford and, with Bernt Balchen as pilot and two other companions, took off on 28 November 1929. The plane circled the Pole, then, after being airborne for nineteen hours, touched down again at the base. Byrd thus had the honour of being the first man to fly over both Poles.

How did New York get its name?

An Englishman, Henry Hudson, employed by Holland, was one of the many explorers who tried to find a route to the Indies via America. Although he sailed far up the river which later bore his name, he did not succeed in discovering a route. Nevertheless, the Dutch claimed all the land on either side of the Hudson despite the fact that it drove a wedge through English possessions. In 1626 they bought Manhattan Island from the Indians, built a settlement there and called it New Amsterdam. A governor was appointed, a onelegged Dutchman called Peter Stuyvesant. This was too much provocation for the English settlers. A fleet sent by James, Duke of York, sailed from England and anchored off New Amsterdam. The town gave in without firing a shot although the governor did all he could to make his men fight. Later its name was changed from 'New Amsterdam' to 'New York' to honour the royal duke who had financed the invasion.

How did Australia's sheep industry begin?

At the end of the eighteenth century, Australia was going through a difficult time. Food was scarce and only storeships from England staved off actual famine. Things were so bad that officers in the army were importing rum and using it instead of money. However, John Macarthur, one of these officers, was convinced that money could be made out of fine-wool sheep, and he left the army to breed Merino sheep. Today there are 150 million of them in Australia.

Who first explored central Australia?

Even by the 1830s, central Australia was still a great mystery. Several people had tried to explore the interior but had been defeated by desert, lack of water and hostile natives. One of these was Edward Eyre, who had failed twice. His third attempt also seemed hopeless but finally, after an appalling journey of 2,000 km, Eyre and Wylie, his faithful aborigine servant, reached the south-west coast at Albany.

Which pirate was also an explorer?

William Dampier was a Somerset man who turned pirate, although the ships and towns he plundered were usually Spanish. In January 1688 he was second-in-command of a ship called the *Cygnet* when the coast of New Holland-as Australia was then called-came in sight. The ship was run into a bay to be careened, and Dampier went ashore with some of the crew. He was therefore in the first group of Englishmen to step on to Australian soil. He met some Aborigines and was to describe them later as 'the miserablest people in the world'. The party explored a little of the coast before sailing away to the north. On returning to England, Dampier wrote the story of his adventures, calling the book *A New Voyage Round the World*. It made him famous, and his reader conveniently forgot his past as a pirate. The Admiralty did the same, for in 1699 he was appointed to command the *Roebuck*. He returned to New Holland and charted much of the coast, including a group of islands now known as Dampier's Archipelago. His ship foundered on the way home, destroying many of his notes and papers, and Dampier and his crew, struggling ashore, were forced to live on turtles and goats until they were rescued, five weeks later.

Who gave the colony of Virginia its name?

Two relatively obscure captains, Arthur Barlow and Philip Amada, were sent by Sir Walter Raleigh to explore the New World. They sailed along the coast between Chesapeake Bay and Florida and claimed the whole area in the name of Queen Elizabeth.I. When they returned to England in 1584 they reported to Raleigh that the land they had found was ideal for settlement. It had good soil, plenty of water and game in abundance. The Indian, too, were peaceful and friendly. Most of them were fishermen who sailed far out from the shore in canoes made from tree-trunks which they hollowed out with burning brands. A skilful artist named John White had gone with the expedition and he showed Raleigh paintings of the green and pleasant country, and of the Indians who lived there. The queen also saw these paintings, as well as the two Indians who had been brought back to England. Raleigh was anxious to send a further expedition to colonize this new territory and Elizabeth suggested that it be called by that name which referred to her unmarried state - 'the Virgin Queen'. And 'Virginia' it became.

When were the first products brought back from the New World?

When John Cabot's ship reached the Newfoundland coast in 1497 he was amazed at the fantastic amount of fish existing in those water. His account of the vast quantities of cod that could be caught simply by lowering a bucket over the side and scooping them up soon brought fishermen of other countries to the area. When Jacques Cartier explored Canada he was similarly impressed by the richness of the country and particularly mentioned the maize, or Indian corn. Early settlers sent back timber and rich pelts, but the two most improtant products broght to the Old World from the New were potatoes and tobacco. Both were introduced into Europe by the Spanish : potatoes from Peru and tobacco from Mexico. They were later brought to Queen Elizabeth's court by Sir Walter Raleigh.

Why are Australians called 'Diggers'?

Early in the 1800s, gold was discovered in Australia. Most of the 'strikes' were in the vicinity of the Blue Mountains near Bathurst. In 1851, a prospector named Hargraves - who had been in California during the gold-rush two years earlier discovered rich traces of gold in Summer Hill Creek. The news spread rapidly and within two months the whole area was swarming with prospectors. The fact that there was gold to be had sent men digging in other areas, especially around Melbourne. In time the cities were deserted and ships lay empty in the harbours, for everyone seemed bitten by the lust for gold. Towns sprang up overnight and were soon the scenes of rioting and bloodshed. The army had to be called in and a battle took place between soldiers and diggers. The incident became known as the battle of Eureka Stockade. By 1856, however, the day of the 'amateur' digger was almost over. Deep shafts had to be sunk to reach the gold and such mines had to be run by companies. But, in memory of

the gold-fush days, Australians are still sometimes called 'Diggers'.

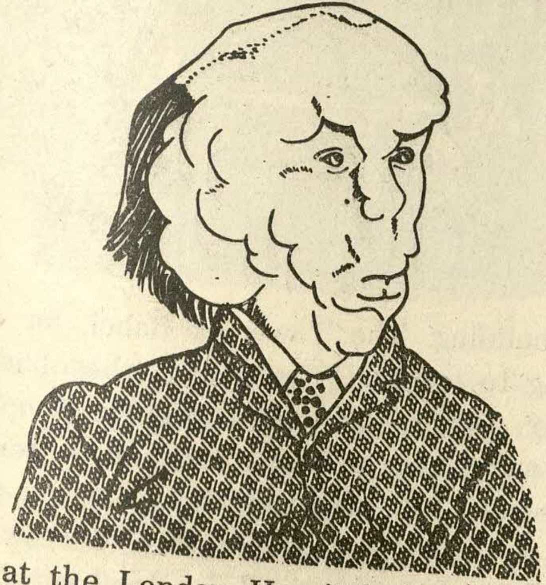
How is man exploring outer space?

From earliest times men have dreamed of travelling in space, exploring new worlds, reaching for the stars - an apparently impossible dream. Then rocket research which took place during World War II gave a great impetus to space travel for which rocket propulsion is essential. After many experiments the first major break-through came in April 1961 when a Russian, Yuri Gagarin, spent 108 breath-taking minutes in space. Three weeks later Commander Alan Shephard of the U.S. Navy also journeyed into outer space. The greatest milestone so far passed was in July 1969 when two more Americans, Neil Armstrong and Edwin J. Aldrin Jr. stepped on to the moon.

THE PAST

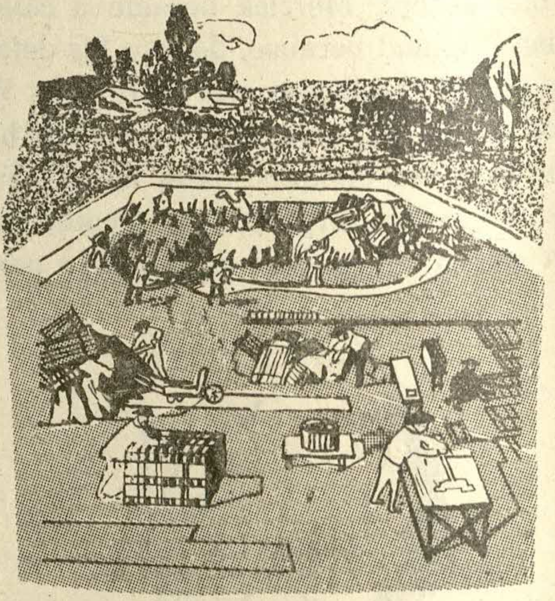
Who was the Elephant Man?

'The Elephant Man' was cruel name given to a man called Joseph Merrick, who was very severely deformed. Although he died before he was thirty years old, Joseph Merrick became a celebrity in Victorian England because, despite his deformities, he was gentle, intelligent and brave man. When he was young, unscrupulous men exhibited him as a freak in fairs and circuses. Later he met Frederick Treves, a London surgeon, who treated him with respect and kindness and gave him a permanent home at the London Hospital. One of Merrick's greatest moments came when the Princess of Wales, later Queen Alexandra, visited him in the Hospital and talked to him for some time. He had always previously been regarded with horror because of his strange appearance.



When were bricks first used?

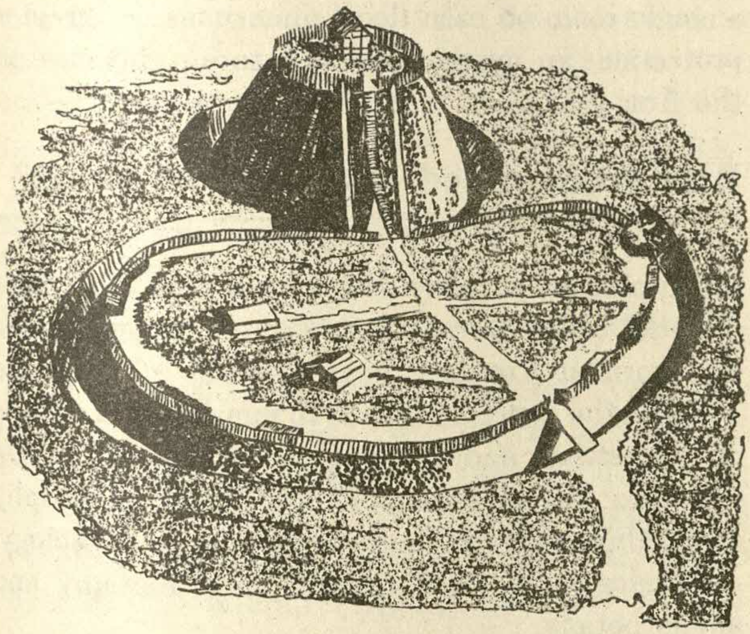
Since the very early days of their history men have been making bricks of clay or other materials for



use in building. The Tower of Babel, for which, according to the Old Testament, 'they had brick for stone', was probably a brick temple. People who lived in ancient Egypt built their houses from both sun-dried and kiln-baked bricks.

What is a 'motte and bailey' castle?

A simple fortification consisted of two parts: a natural or artificial mound with a wooden tower or keep on top, and a larger area at the foot of the mound enclosed by palisades, called a bailey. The bailey was used for stores and huts. This outer walled space sometimes had a ditch in front of it which might be flooded to make a moat.



These 'motte and bailey' castles were built mostly in France during the tenth century, but the building of this type of private fortress spread over western Europe in the following century. In the Middle Ages land was owned under the feudal system. Princes and nobles kept private armies to enforce power over their own domains. War was constantly breaking out between local lords, and a fortified dewlling was essential. These castles were simple but effective. They could withstand a siege. Gunpowder had not yet been invented and success was achieved by starvation - or treachery. They offered a refuge for neighbouring villagers and their flocks.

Little trace remains today of the wooden 'motte and bailey' castles, but many with stone keeps are still standing. They were tall, square buildings, with a single room on each floor. sometimes, for greater protection, an outside stair led to an entrance on the first floor.

Who popularized mountain climbing?

Mountaineers of today owe a good deal to a Swiss scientist called Horace Benedict de Saussure, who was born at Conches, near Geneva, in 1740. He changed the general attitude to mountains from one of superstition and dread to one of inspiration. De Saussure was professor of physics and philosophy at the University of Geneva and a pioneer of geology, mineralogy and meteorology, plant anatomy and alpine botany.

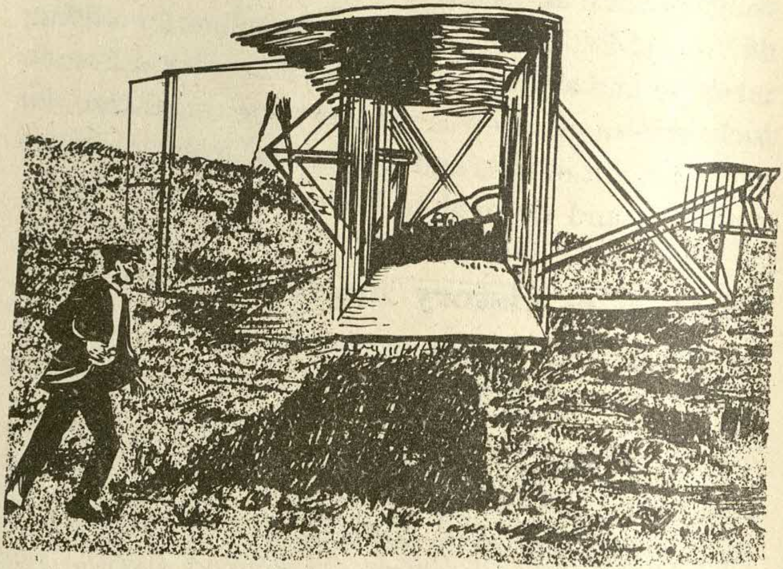
He was the first traveller to reach the summit of Mont Blanc (1787) and to measure its height by barometric pressure.

Who were the 'Bird Men'?

The story of man's attempt to rival the birds is as old as the human race. from Greek mythology we have the story of Icarus who had wings of feathers sewn on with threads and fastened with wax. He flew too near the sun, and the wax melted. Icarus fell into the sea and was drowned. oliver of Malmesbury, an English monk, tower-jumped with wings in 1020 and survived - with injuries. Leonardo da Vinci (1452-1519) gave the world plans for a flying machine and a parachute. In 1678 Besnier, a French locksmith, created a glider-type machine, an arrangement of rods and planes worked by his hands and feet, and claimed to have flown over a barn.

When was history made in twelve seconds?

The date was 17 December 1903; the scene: the cold windy hills of North Carolina; the name of the place which was to go down in history: Kitty Hawk; the occasion: man's first powered flight. The aeroplane had arrived. Orville Wright was at the controls. The aircraft, powered by a four cylinder engine, careered through space for twelve seconds at 48 km. p.h. airspeed, swept down and landed in soft sand. Orville wrote: 'This flight lasted only twelve seconds but it was, nevertheless, the first in the history of the world in which a machine, carrying a man, had raised itself by its own power into the air in full flight, had sailed forward without reduction of speed and had finally landed at a point as high as that from which it started.' The Wrights' aircraft was called *Flyer*. Only five people were there to watch it make history. One photograph recorded the scene. It was not until three years after Kitty Hawk that the *Scientific American* wrote: 'In all



the history of invention there is probably no parallel to the unostentatious manner in which the Wright Brothers of Dayton, Ohio, ushered into the world their epoch-making invention of the first successful aeroplane flying machine.'

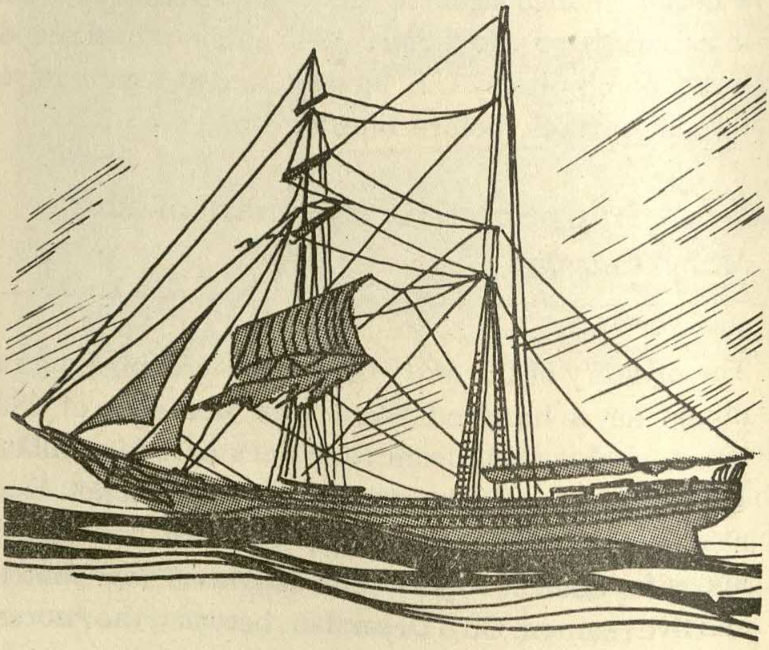
Which was the largest battleship ever built?

The greatest of the fighting giants of the sea was the Japanese *Yomato*. She gave her name to a class of four battleships designed to be invincible. *Yomato* displaced 72,000 tons. Her main armament consisted of nine 45.9 cm guns in triple turrets - overwhelmingly superior to any other battleship in the world. The *Yomato* was completed soon after the Japanese attack on the U.S. base at Pearl Harbor on 7 December 1941. Her last mission wa to Okinawa, with enough fuel for a one-way trip. The object was to act as a diversion, and to give the Japanese 'suicide' pilots a better chance against American aircraft carriers in action there. On 7 April 1945 she survived seved heavy bomb hits by U.S. aircraft, and at least twelve torpedo strikes, before blowing up.

What happened to the men of the *Mary Celeste?*

The mystery of the *Mary Celeste* has occupied men's minds for a hundred years. She was ship of 282 tons and she sailed from New York on 7 November 1872 bound for Genoa, with a cargo of alcohol. Her master was Benjamin Briggs, and with him sailed his wife, their two-year old daughter, two mates and five seamen. On 5 December, between the Azores and Portugal, she was sighted by another vesel, which sent a boarding party on to her. They found no one on board. Some sails were set, the wheel was free. One version of the discovery said that in the cabin the table was laid for a meal. In the crew's quarters were pipes and tobacco. Cups of tea were still warm, so was the galley stove. The chronometer and ship's papers were missing. But the log was there and the last entry gave her position ten days earlier as 36° latitude north and 27° longitude west.

Sitting on a locker was the only living thing aboard the ship - a fat cat, asleep. In the cabin was discovered a cutlass. It was blood-stained. One of the ship's boats was missing and one of the hatch-covers was open. Theories came in profusion, but from that day to this no one has ever been able to establish with certainty what happened to the crew of the *Mary Celeste*.



What was the Boston Tea Party?

One of the immediate causes of the American War of Independence (1775-83) was a conflict between the British Government and the American colonists over taxes imposed by the British. Tea was one of the things taxed. On 16 December 1773 Samuel Adams, a political leader of the colonists, presided over a mass meeting of Boston townsfolk. 'This meeting', he announced, 'can do nothing more to save the country.' At this signal fifty to a hundred men disguised as Red Indian boarded ships carrying tea from Britain and hurled their cargoes into the harbour. This was known as the Boston Tea Party. Retaliation followed. The port of Boston was closed, and the colony of Massachusetts was deprived of many of its rights of government. The colonists banded together. Agitation was whipped up. Volunteers began to arm and drill. On 19 April 1775 British troops, sent to seize a store of muskets, were attacked at Lexington, and this was the signal for the outbreak of war.

Where is tea-drinking a time-honoured ritual?

The ceremonial drinking of tea has long been a time-honoured institution in Japan. The central idea of the ceremony is the appreciation of the beautiful in life's daily routine such as preparing a meal and tea, cleaning the house, working in the garden and so on. The ceremony is called in Japanese *cha-no-yu* (which can be interpreted as 'hot water tea'). It is a way of entertaining guests, who after they have been served a meal are given thick, weak tea made of pulverized tea leaf stirred in hot water. The entertaining is done in a small room. It may be 2.7 m square or even smaller. Much thought is given to the construction of the little room. There is an alcove in which ornaments may be placed and there is a small sunken fireplace. This is used for heating the kettle during winter. In summer a brazier with a charcoal fire is used. The way the guests enter the room is designed to demonstrate humility. Their way in is through an opening less than 1 m square. The tea room is called *chaseki*. Before entering the *chaseki* each guest is required to wash his hands and rinse his mouth. This is a symbolic gesture of cleansing himself externally and internally and is one of the four qualities which the tea cermony emphasizes. There are three other qualities which are part of the ceremony. One is harmony between the guests and the utensils used in the ritual. Another is respect not only among those taking part, but also for the utensils. Yet another is tranquillity, which suggests the quality of mellowness given to things by long and fond use.

What is the significance of the date 2 June 1953?

In London a moment of historic pageantry was celebrated on this day - the Coronation of Queen Elizabeth II. It was also the day when London heard the news of the conquest of Mount Everest's 9,608 m by Edmund Hillary, a New Zealander, and Tensing, the famous Sherpa porter from Nepal. The London *Times* wrote:

'Seldom since Francis Drake brought the *Golden Hind* to anchor in Plymouth Sound has a British explorer offered to his Sovereign such a tribute of glory as Colonel John Hunt and his men are able to lay at the feet of Queen Elizabeth for her Coronation day.' The queen sent a message to the Everest expedition expressing her 'warmest congratulations on [their] great achievement.'

What was the Indian Mutiny?

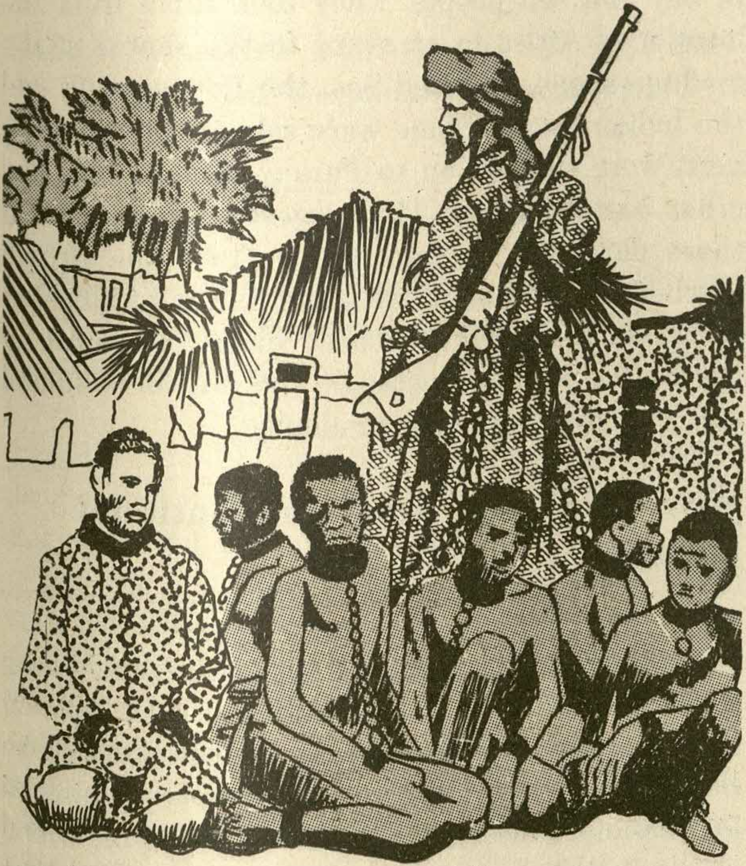
This was a revolt by Indian soldiers, or sepoys, against their British officers and rulers in 1857. One of the immediate causes was the issue of new cartridges. These were believed to contain the fat of cows, sacred to Hindus, and of pigs, which Moslems regarded as defiling. In May eighty-five sepoys at Meerut were court-martialled for refusing to use the cartridges. The sepoy garrison mutinied, captured and killed officers and marched on Delhi. There, too, the sepoys rose. Others joined them, and many Europeans were killed. The mutineers acclaimed a new ruler - a descendant of one of the old Mogul emperors.

Rebellion spread like fire through the state of Oudh, with its capital Lucknow, and into Bengal and central India. But in northern India the Punjab was held firmly in the grip of its chief commisioner, John Lawrence. In September, Delhi was retaken. The garrison at Lucknow held out, and after British reinforcements had reached Calcutta, the rebel armies were finally defeated at Lucknow in March, and in central India in June 1858.

The East India Company (whose sepoys had helped to conquer India) was abolished. The number of British soldiers in India was increased, and British rule went on for another ninety years.

Why was Africa the centre of the slave trade?

Trade in human slaves began in the earliest times and went on until the nineteenth century.But it was in the sixteenth century, after the discovery of America when the need grew for labour on the new plantations, that the slave trade began to



increase. Its centre was Africa. Millions of slaves were transported form that continent. The British, French, dutch, Portuguese and Spanish all engaged in the trade. There was also a trade by the Arabs across the Sahara and from East Africa to Asia. The Arabs had a long history of slavery, and their

African traffic in human merchandise was only suppressed towards the end of the nineteenth century. After the trade had been made illegal by western nations, Arab dealers in Africa continued to buy and sell people. They took them from the interior of Africa in caravans to the shores of the mediterranean, the Red Sea, the Persian Gulf and the Indian Ocean. Some were sold at the coast but most were shipped on to Turkey, Arabia, Iran and other eastern lands. The biggest slave market in those days was in Zanzibar. In 1845 the British reached an agreement with the Sultan of Zanzibar by which his territory ceased to be the centre of the traffic, but it persisted on the African mainland and was abolished only gradually.

Who wrote the American national anthem?

When the British retreated from Washington during the war of 1812 they took prisoner a Dr William Beanes and held him abroad a warship in Chesapeake Bay. Francis Scott Key, an American lawyer, obtained permission to intercede for the release of his friend as the British fleet was preparing to bombard Fort McHenry, which protected Baltimore. The British agreed to release Beanes but held both Americans until the battle ended. So from the midst of the enemy, key watched the British shelling his countrymen. The captives knew Fort McHenry had little defence, but as the smoke and haze of battle cleared they saw the American flag still flying. Key wrote down the words of a poem, 'The Star-spangled Banner'. Set to music it became the national anthem of the United States in 1931.

'... the star-spangled banner in triumph shall wave
O'er the land of the free and the home of the brave.'

What are mosaics?

A mosaic is a picture or pattern made by placing, or fixing, small different-coloured pieces of stone or glass side by side.

The art was an invention of the Mediterranean peoples and flowered between c. 300-31 B.C. In the Roman period, or about the first five hundred years of the Christian era, mosaics of great beauty and variety were designed all over the empire spreading from Syria to Spain, and from Africa to Britain. The most brilliant mosaics in the world adorn walls and ceilings of sacred building in Rome, Ravenna and Salonika. Mosaics which have been discovered dating from the pre-Christian era were for the most part laid on the floor.

Who was the first prime minister of the Commonwealth of Australia?

Australia, like the United States, is a federal union.

The six Australian states - Queensland, New South Wales, Victoria, Western Australia, South Australia and Tasmania - joined themselves together in 1901 to form one country. The first prime minister of the Commonwealth of Australia was a barrister, Edmund Barton. During the 1800s the Australian states were separate self-governing colonies of England. But customs and policies differed and a union was proposed. Federation become a fact on 1 January 1901. The Duke of York opened the first Federal parliament. Barton was a superb orator and risked his political career by becoming leader of the federal movement. He did a great deal to shape the actual form of the Commonwealth constitution, and was a member of the delegation which went to England with the bill in 1900.

Edmund Barton was knighted in 1902, when he resigned the premiership. He became a judge of the high court of Australia the following year, and died, aged seventy-one, in 1920.

What is sanskrit?

Sanskrit is the name given to the ancient classical language of the Hindu inhabitants of India. It was introduced into India probably about 1500 B.C. and was for a time the spoken language as well as the literary language. The sacred Hindu books - the Vedas - were written in Old Sanskrit, but the name really applies only to the form of the language defined by the Indian grammarian Panini about 400 B.C. He wished to teach the correct form of speech of the learned men of his day and to protect the language from popular corruptions.

BOOKS

What were the real names of the three musketeers?

The names that the famous swordsmen assumed when they joined the French King's bodyguard of Musketeers were Athos, Porthos and Aramis. By these names they are known throughout Alexandre Dumas' magnificent novel *The Three Musketeers.*

It is not until the swashbuckling D'Artagnan sets out twenty years later, that the true names of them all are revealed. D'Artagnan, now Captain of the Musketeers, discovers that Athos, the severe exmusketeer, is now the Count de la Fere who is living on an estate near the town of Blois.

The giant Porthos, so gentle and trusting, the most lovable of the Musketeers has become the proud Seigneur du Vallon de Bracieux de Pierrefonds, a country gentleman still yearning for the days of high adventure.

Aramis, always secretive, a born conspirator with an eye for the ladies, has entered the church and is now known as the Abbe D'Herblay.

It is in *Twenty Years After,* the fast-moving sequel to *The Three Musketeers* that D'Artagnan meets up with his friends once again, but the days when the four good friends rode together, all for one and one for all, are at an end. D'Artagnan and Porthos, fighting in England in the ranks of Oliver Cromwell's

Roundheads, come face to face with Athos and Aramis who have joined the army of King Charles the First. All ends well for the four friends, however. Their friendship as firm as ever, they part at the end of *Twenty Years After,* not knowing whether they ever will meet again.

This, though, they do in the continuing saga of the Three Musketeers - the long novel known as *The Viscount of Bragelonne.* The Viscount, hero of this book, is the son of Athos.

Why is there a dodo in *Alice in Wonderland* ?

When Lewis Carroll wrote *Alice In Wonderland,* he introduced the nicknames of some of his friends. The Lory was young Lorina Liddell, the sister of Alice on whom Carroll based his book. The Eaglet was Alice's other sister Edith. As for the Dodo, this was Carroll himself.

Lewis Carroll was born January 27, 1832. In 1861, he decided to enter the church. He was ordained deacon but his hopes of preaching were dashed because he stuttered. This had the effect of provoking his listeners to laughter.

His real name was Charles Ludwidge Dodgson and when he introduced himself he would stuter: "Do-do-Dodgson." That was why he wrote a Dodo into his great book.

Lewis Carroll died January 14, 1898.

Who wrote the book *Moby Dick* ?

The American author Herman Melville. He was born August 1, 1819 in New York, the son of Allan Melville, a ne'er-do-well importer of the most fashionable clothes and expensive materials. When in 1812 war broke out between Britain and the United States, the business failed. In 1832 Herman Melville's father died, his mind unbalanced by the misfortunes of his business affairs.

Young Herman was then attending an academy in Albany. Two years later, at the age of fifteeen, he commenced work in a bank, his uncle being the president. This job did not last long and Herman Melville then worked for his mother and his elder brother Gansevoort in a store which they owned. Once again, however, he was soon on his way, but this time to be a farmhand on another uncle's farm.

The spirit of adventure ran very strongly in Herman's veins and he was eighteen years of age when he signed on as an ordinary seaman on board the freighter *Highlander,* then bound for the English port of Liverpool.

It was a life of terrible hardship and when the ship returned to New York, Herman made off and found employment as a school-teacher. During his school-teaching days, he tried his hand at writing but met with no success.

Again, adventure lured him to sea and once more, as an ordinary seaman, he was a member of a ship's crew when it set sail for the South Pacific, hunting for whales.

He was now twenty-two and there followed two years of harsh treatment at the hands of ruthless officers. He deserted his first ship, then joined another whaler and took part in a mutiny. Arrested later, he and other mutineers were imprisoned. Luck was with him for he escaped and after working for a time in a store in Honolulu, he joined the US Navy as an ordinary seaman. On board the frigate *United States* he then returned home.

Then began his successful career as an author and for nearly twenty years he also occupied a post in the custom house in New York. He died there on September 27, 1891.

He wrote several novels of which *Moby Dick* is considered his masterpiece. Moby Dick is a monstrous white whale, hunted with a ferocious obsession by the half-crazy Captain Ahab who has lost his right leg in a previous encounter with the great whale. After many adventures, Ahab finally catches up with Moby Dick. In the terrible battle that follows, Ahab's ship is sunk and only one seaman survives to tell the tale.

Other famous books by Melville are *Typee, Omoo,* and *White Jacket*. *Typee* is a fictional version of the young Herman Melville's exciting adventures at sea and is of special interest because it was the first book written about the South Seas.

What is the name of the private detective whose adventures were written by Raymond Chandler?

Philip Marlowe. He first appeared in *The Big Sleep*. Chandler had been writing for a popular periodical entitled *Black Mask* for some years when he wrote his first novel *The Big Sleep* in 1939. It met with great success, so much so that Chandler continued Philip Marlowe's bleak adventures in *Farewell My Lovely, The High Window, The Lady in the Lake, The Little Sister, The long Goodbye* and *Playback*.

Raymond Chandler was born in Chicago, January 23, 1888, but from the age of seven was brought up in England where he lived for 17 years.

During this time he was educated at Dulwich College. Interested in writing, he worked as a journalist in London but returned to America when he was 24. The First World War broke out in 1914. Chandler joined the Canadian army but when demobilised he started work with an oil company in California, the background for his Philip Marlowe thrillers. In 1933 he again took up his writing activities and forsook his business career. He died March 26, 1959.

Who wrote, illustrated and then published at her own expense *The Tale of Peter Rabbit?*

Helen Beatrix Potter, born July 6, 1866, paid for only 250 copies of *Peter Rabbit* to be printed in December 1901. Two months later, a second edition of 250 copies were printed. Later, in 1902, Beatrix Potter (the name she wrote under) published, again at her own cost, *The Tailor of Gloucester*. 500 copies were published.

In the year 1903, the publishing firm of Frederick Warne took over publication of her books. The first was *Squirrel Nutkin* which proved to be a great success.

Beatrix's fame was assured and a long series of books all written and illustrated by her then followed, until 1918 when *Johnny Town-Mouse* appeared. Regrettably this was the last of her charming little animal books. She continued to produce books, *The Fairy Caravan* for example in 1928, but none enjoyed the success of *Squirrel Nutkin, Two Bad Mice, Mrs Tiggy Winkle, Tom Kitten, Jemima Puddle-Duck, The Flopsy Bunnies* and the others that enchanted millions of children everywhere.

Beatrix Potter was the daughter of wealthy parents and never went to school. In fact, she taught herself to draw and although some later artists tried to imitate her inimitable style, none could capture her innate style and emotion.

In 1905 she purchased Hill Top Farm at Sawrey in the English Lake District. Later she was to buy two more farms and specialised in the Herdwick breed of sheep which were particularly suitable for that area. She worked on her farms, wrote her books, married, and died April 30, 1943.

What famous mystery novel was left unfinished by which well-known author?

The Mystery of Edwin Drood was still incomplete when Charles Dickens suddenly died in 1870. Edwin Drood is a young man engaged to a lovely girl named Rosa Bud although little love exists between them. Rosa has attracted the attention of another young man, by name Neville Landless. Edwin and Neville quarrel violently one day and soon afterwards, Edwin and Rosa decide not to marry after all. That night Edwin disappears.

Foul play is suspected and Neville is arrested. He is later released but the mystery remains. What can have happened to Edwin Drood? Only Charles Dickens knew, so the rest is silence.

Which notorious duellist was also an author and playwright?

Savinien Cyrano de Bergerac. He was a Gascon, as was D'Artagnan the hero of *The Three Musketeers*. In fact, both swordsmen lived at the same time for D'Artagnan really lived. He was a King's Musketeer who became a Marshal of France. Cyrano de Bergerac was born in Perigord in Gascony, a south-west province of France in 1619. He was educated at the College Beauvais and later joined the King's Guard. He divided his time between fighting duels and literature. He fought a great number of duels, most of them to avenge insults about his enormous nose.

His best known books are the *Comic History Of The States and Empires of the Moon,* and the *Comic History of the States and Empires of the Sun.* Hints of these two books are seen in books written two centuries later by Jules Verne. De Bergerac also wrote successful plays.

His turbulent life came to an end in 1655, when he was only 36 years of age.

Who wrote *The Swiss Family Robinson?*

A certain professor of philosophy at the Swiss University of Berne. His name was Johann Rudolph Wyss and he was the son of a pastor, born at Berne, March 13, 1781

The Swiss Family Robinson was based on a tale told to Johann Wyss by his father.

Who was the Army Nurse who won fame by writing books for girls?

Her name was Louisa May Alcott. She was born in Germantown, Pennsylvania, on November 29, 1832, the daughter of Amos Bronson Alcott, a struggling educationalist who could obviously have profited by a little education himself in a few financial matters.

Louisa became an army nurse during the American Civil War and in 1863 her book *Hospital Sketches,* a record of her army experiences, was published. It was this book that earned her some measure of success, although her first book *Flower Fables* had been published in 1855.

She wrote primarily to support her family and rather feckless father. In 1869. her book *Little Women* appeared and Louisa May Alcott's name was ranked with the famous writers.

There now followed more books in the same vein, *An Old Fashioned Girl, Little Men, Good Wives* and *Jo's Boys.*
She died March 6, 1888, but her books have never lost their appeal.

Which queen's favourite started to write *The History of the World* while awaiting execution?

None other than the famous courtier to Queen

Elizabeth I, Sir Walter Raleigh.

After Queen Elizabeth I died, King James I ascended the throne. James did not like Raleigh who was soon arrested on a trumped-up charge of high treason, condemned to death and imprisoned in the Bloody Tower at the Tower of London.

It was there that he wrote the first and, as it transpired, only volume of *The History of the World.*

Raleigh was reprieved on the scaffold and returned to prison. He obtained his release on condition that he should lead an expedition in search of gold, which the king badly needed, to Venezuela in South America.

He promised not to interfere with Spanish settlements but came into collision with the Spaniards when his son, Walter, was killed.

The grief-stricken man then sailed back to England where the furious Spanish ambassador was demanding punishment. Raleigh was once again arrested on the old charge of treason and was executed on October 29, 1618.

Who was the first American Author to Achieve International Fame?

Washington Irving, who had fought against the British in the War of Independence. He wrote many books, amongst them his *Legends of the Alhambra* and *The Legend of Sleepy Hollow.* But it is *Rip Van Winkle* for which he is best remembered today.

Born on April 3, 1783, he died November 28, 1859, already regarded as an author of note throughout the world.

Why did Arnold Bennett write under the nom-de-plume of *"Gwendolyn"*?

Because he first started writing on the staff of a women's periodical. He spent four years writing a gossip column under the odd penname of "Gwendolyn." He regarded the time thus spent as the most valuable part of his life. He later became the assistant editor and then editor of a weekly magazine called *Woman.* His later comment was: "I learnt nothing of letters in that office, but I learnt a good deal about the secret nature of women."

Arnold Bennett's best writing was invariably about ordinary working people and their lives. When he attempted to portray the life of high society, his approach was rather clumsy and artificial.

He was born May 27, 1876, the son of a solicitor. He went to London in 1888, working first as a clerk and then as a journalist. His first novel *A Man from the North* was published in 1898. One of his most popular books was entitled *The Card.*

"Card" is a slang name for a person who loves to attract much attention. Edward Henry Machin, better known as Denry, is just such a person, albeit a very likeable one. "He is identified." says one of his friends at the close of the book "with the great cause of cheering us all up."

This, Denry does with rare flair. His merry adventures with the local aristocracy, football team and a host of councillors and city elders who are suspicious of his rapid money-making ways, have a freshness and vigour which Arnold Bennett rarely touched again.

Enoch Arnold Bennett, which was his full name, wrote many stories about the "Five Towns" that today make up Stoke-on-Trent in Staffordshire, England. The background of *The Card* is that district.

Bennett later married a French woman and lived for eight years at the town of Fontainebleau, 31 miles (50 km) south of Paris, an experience which stood him in good stead when he wrote his best book *The Old Wives Tale.*

He died March 27, 1931, still at the height of his powers.

When was *The Arabian Nights Entertainments* first written?

It is difficult to pin an exact date for this very popular series of stories because they come from various sources, Indian, Persian and Arabian. Sir Richard Burton, who was responsible for the most popular translation, reckoned that some of the stories · *Sinbad,* for instance - dated back over a thousand years.

Who was the English Baron who liked to use the words "The last" in the titles of his books?

He was Edward George Earle Bulwer-Lytton, first Baron Lytton who was born on May 25, 1803. Although his works were admired by Charles Dickens and were popular in his time, they are not often read today.

Four of his most famous books are entitled *The Last Days of Pompeii, Rienzi, The Last of the Roman Tribunes, The Last of the Barons and Harold, The Last of the Saxon Kings.*

Renowned as a wit and a dandy, Lytton was twice a member of Parliament and was also acclaimed as a playwright and poet of some considerable ability. He died January 18, 1873, and was buried in Westminster Abbey.

Who wrote 66 best-selling mystery novels in 56 years?

The author responsible for this phenomenal output was Mrs Agatha Mary Clarissa Christie

She was born in Torquay and during the first World War she took a job as a hospital dispenser. While she carried out her duties, she learned much about various deadly poisons and the knowledge she gained was to stand her in good stead when, after the war ended in 1918, she commenced to write murder mysteries.

Her first novel was *The Mysterious Affair at Styles* which was published in 1920. Its success encouraged her to continue with her writing and from then until she died in 1976, she wrote 66 books.

Agatha Christie's two most famous detectives are Hercule Poirot, the Belgian private investigator and Miss Marple, who manages very quietly to solve the most intricate of mysteries.

What is the name of the priest who is famous for solving mysteries?

It is Father Brown and his exciting adventures were written by Gilbert Keith Chesterton who was born in London, May 29, 1874.

Next to Sherlock Holmes, Father Brown is probably the most original and eccentric detective in English fiction. He is timid and absent-minded, and in his appearance is short and dumpy, with a round innocent face. He carries a large umbrella and has the air of someone who is unable to read a train time-table successfully, let alone solve a cunning murder.

Father Brown first appeared in the book entitled

The Innocence of Father Brown, in 1911. Four more Father Brown volumes were to follow, namely *The Wisdom of Father Brown, The Incredulity of Father Brown, The Secret of Father Brown* and *The Scandal of Father Brown.*

G K Chesterton, who created Father Brown, was the son of a real estate agent in Kensington. He was educated at St Paul's School and later studied art at the Slade school in London. He was proficient enough to illustrate the novels of his friend, Hilaire Belloc. However, it was to journalism that he finally turned. Soon he was producing essays and articles which were published in book form.

In 1901 he married and three years later published the first of his popular fantasies *The Napoleon of Notting Hill.*

G K Chesterton died on June 14, 1936.

Who was The last of the Mohicans?

In his world famous book, James Fenimore Cooper names Chingachgook, the Mohican friend of Natty Bumppo, better known as Hawkeye the Hunter.

The story takes place at the time of the French and Indian Wars in America.

It begins with an English officer, Major Duncan Heyward, in company with Cora and Alice, the daughters of Colonel Munro, setting out from Fort

Edward to travel through the dense forest to Fort William Henry. There they are to meet with the girls' father, the commandant of Fort William Henry.

Magua, a renegade Huron Indian, offers to lead them to the fort by a short route. The Huron plans to lead Cora and Alice into a trap but the little party meet up with Chingachgook, his son Uncas, and Hawkeye the Hunter.

These three men swiftly realise what Magua is about and reveal him for what he is. They try to capture the Huron but the cunning rascal makes good his escape.

The book finally ends in tragedy with Uncas slain by Magua who is, in turn, killed by Hawkeye. Cora dies at the hands of a savage Huron, leaving Alice and Heyward the only survivors of the little party that originally set out from Fort Edward.

Hawkeye returns to his beloved forest, there to remain forever with his good comrade, Chingachgook, the last of the Mohicans.

James Fenimore Cooper, the American novelist, was born at Burlington, New Jersey, September 15, 1789. Educated at Yale for a time, he served in the American navy.

His books about the colonial days in America and his novels about the sea, enjoyed great success but his habit of criticising the United States made him very unpopular with his fellow country-men.

He was 61 when he died the day before his birthday in 1851.

Who wrote a book about The son of Aladdin?

Noel Langley, who was born in South Africa, December 25, 1911. The title of the book is *The Land of Green Ginger.* Like the original story of Aladdin as told in *The Arabian Nights Entertainment,* it concerns the adventures of a day amid wizardry and magicians.

So far as writing is concerned, Noel Langley was a man of many parts. He wrote books for adults-*Cage me a Peacock* is one of his best-known - and novels for children, as well as film scripts for Hollywood studios. He was one of three writers for the screen-play of *The Wizard of Oz.*

Noel Langley died November 4, 1980.

Who was O Henry?

He was an American author whose real name was William Sydney Porter. He was born September 11, 1862, in the quiet little village of Greensboro in North Carolina. He fell ill with a bad lung in 1882 and left North Carolina for a ranch in Texas where he worked as a cowboy. He recovered his health and later worked as a newspaper reporter.

In 1894 he became proprietor and editor of a humorous weekly entitled *The Rolling Stone*. He was, for a short while, a bank clerk but the bank failed and later he was falsely charged with the embezzlement of a small amount of money.

He was on his way to stand trial but boarded the wrong train and ran away to Central America. It was then that he took to the outlaw trail and for twelve months, was either at sea with smugglers or riding with bandits.

It was when he heard that his wife was seriously ill that Porter returned to Texas and surrendered to the law. He was allowed to stay with his wife until she died and he was unjustly sentenced to five years' imprisonment. He wrote the first of his famous short stories while he was in the penitentiary. It was now that he adopted the penname of O Henry, sending his stories through a sister living in Pittsburgh, to various magazines.

He was released in 1902 after serving a minimum term of imprisonment and he went to New York, sure of a welcome from editors who had been buying his work.

His first book of short stories, *Cabbages and Kings*, was published in 1904. This was largely based on his own adventures in Texas and Central America. Then he turned his hand to tales of New York City and in particular, to the poor people who dwelt there. His stories could be wry, thrilling and amusing in turn, with O Henry making the most of a vast canvas of fascinating characters.

Although he became the most popular short story writer of the time, he was always modestly paid and being a generous man, was constantly having to pour out material to make ends meet. It is on record that at certain times he turned out as many as fifty stories a year. He made famous the dramatic twist at the end of a story that was copied by many authors after him. O Henry died June 5, 1910.

Who wrote the famous fairy story *Cinderella?*

This story is considered one of the greatest fairy tales. Indeed, most critics would undoubtedly accord it the accolade of being the greatest.

The idea of a poor young girl being ill-treated by her step-mother, and then with fairy help, receiving beautiful clothes, complete with rich shoes which lead to a Royal marriage, dates as far back as the 9th century when it appeared in China in a volume of tales of magic.

First publication in print of the famous story is credited to the French author, Charles Perrault who was born in Paris, January 12, 1628.

He was a poet who also wrote memoirs and other works but his fame rests on a series of immensely popular fairy tales, issued in volume form in 1697. It contained the tales of *Puss in Boots, Little Red*

Riding Hood and *The Sleeping Beauty* as well as *Cinderella.* Charles Perrault died May 16, 1703.

Who wrote under the nom-de-plume of Saki?

This was Hector Hugh Munro, born in Burma on November 12, 1870. His fame as a writer rests on his brilliant short stories which have been collected in several volumes such as *Reginald, Reginald in Russia* and *The Chronicles of Clovis.* He was only a child when his mother died and, in Devonshire, England, he was brought up by two aunts. Returning to Burma in 1893, he joined the military police but fell ill and was invalided home.

He began to write and his first book was *The Rise of the Russian Empire.* He then wrote newspaper articles and in 1904 wrote his first book of short stories *Reginald.*

Several more books of short stories followed, all showing his mastery of style, a biting wit and a superb power of describing the macabre and the supernatural.

When the war broke out in 1914 he enlisted and was killed at Beaumont Hamel, France on November 13, 1916.

Who was Christopher Robin's father?

Christopher Robin Milne was the son of Alan

Alexander Milne who was born January 18, 1882.

It was A A Milne who was responsible for the world-famous books about the fabulous honey-lover Winnie-the-Pooh and Winnie's close friend, Milne's own son, Christopher Robin.

Christopher Robin first appeared in a book of verse entitled *When We Were Very Young* in 1924. Prior to this, A A Milne had worked on the staff of *Punch,* the English humorous weekly magazine and was its assistant editor from 1906 to 1914.

Although several of his contributions had appeared in books such as *Once A Week* in 1914 and *If I May* in 1922, it was *When We Were Very Young* that set him amongst the best-known writers of his day.

Winnie-the-Pooh which was published in 1926, was the first book to feature the lovable little bear. *Now We Are Six,* like *When We Were Very Young,* was a book of verse in which Winnie-the-Pooh and his friends re-appear. This was published in 1927 and the following year saw the appearance of the last book concerning Christopher Robin, Winnie-the-Pooh, Piglet, Kanga and Tigger and the rest of that merry crew. *The House at Pooh Corner* was its title.

In 1919 A A Milne wrote a children's play *Toad of Toad Hall* based on the book *The Wind in the Willows* which had been written by his friend, Kenneth Grahame.

After that he wrote another play for children, *The Ugly Duckling* which was published in 1941 and thereafter Milne wrote no more for children.
He died January 31, 1956, in Hartfield, Sussex at the age of 73. As for his son, who has enjoyed the glories and suffered the torments of being immortalised in his father's famous books, he is nowadays a book-seller in Devon.

Which author wrote three books, each containing the word beau in its title?

The titles of the three books are *Beau Geste, Beau Sabreur* and *Beau Ideal* and they were written by Percival Christopher Wren who was born in 1885.

Having served in the British, French and Indian armies and having been a member of the French Foreign Legion, he was for a while assistant director of public education in the Bombay Presidency.

His dramatic and action-packed novels of life in the Foreign Legion won him immense popularity as an author. *The Wages of Virtue,* published in 1916, was the first. *Beau Geste* came along in 1924 and it is for this book that he is world-renowned. *Beau Sabreur* in 1926, *Beau Ideal* in 1928 and *Flawed Blades* in 1933 were the rest of his Foreign Legion novels.

He wrote other books but not one achieved the same success as those with a Foreign Legion background.

Beau Geste has been filmed by Hollywood on at least three occasions. It has also appeared as a television serial.

P C Wren died November 23, 1941.

Who was the Oyster Pirate whose books became famous?

This was Jack London, the celebrated American author, who was born at San Francisco, January 12, 1876. His full name was John Griffith London (the surname of his stepfather). He was successively an oyster pirate, member of a fishing patrol and a seaman on a sailing vessel. He took part in the Klondike gold rush of 1897 and tramped through the United States and Canada.

Taking advantage of all his various experiences, he wrote a book of short stories in 1900 about the Far North, *The Son of the Wolf*. It was *The Call of the Wild,* though, that made him a best-selling novelist. The book was published in 1903. This was followed by *The Sea Wolf* in 1904 and *White Fang* in 1907, both very popular books. Meanwhile in 1905 he was a war reporter, covering the Russo-Japanese War.

He was responsible for nonfiction books such as *The War of the Classes* and other volumes of a socialist nature.

He was only 40 years of age when he died November 22, 1916.

To whom does *The Swan of Avon* refer?

To William Shakespeare, the son of John Shakespeare, a dealer in wool and leather, who lived in Stratford-upon-Avon. In this little town standing on the banks of the River Avon in Warwickshire, was born in April 1564, the boy who was to win immortal fame as the world's greatest dramatist, the good friend of nobles and the wonder of his and every age.

This gentle man of immeasurable genius has, through the hundreds of years since he died on April 23, 1616, been unmatched as a poet and playwright.

Often referred to in the words of his great friend Ben Jonson as "The Swan of Avon," William Shakespeare is England's greatest gift to the literature of the world.

Who wrote the *Bulldog Drummond* Novels?

His pen-name was Sapper, his real name being Cyril McNeile, born 28 September, 1888. He was the son of a naval captain and entered the Royal Engineers, (whose nick-name is The Sappers) in 1907. He served through the First World War, retiring from the army with the rank of lieutenant colonel in 1919.

He began his writing career with *Sergeant Michael Cassidy* and other works inspired by the war but it was in 1920, with *Bulldog Drummond,* that his reputation as the author of exciting tales was established. This book, truly a classic among adventure stories, was dramatised several times, filmed and enjoyed a great success.
The sequels to *Bulldog Drummond* were also best-sellers. They are: *The Black Gang, The Third Round, The Final Count, Temple Tower, The Female of the Species, The Return of Bulldog Drummond, Knock-Out, Bulldog Drummond at Bay* and *Challenge.*

Cyril McNeile died August 14, 1937.

What was the only book for which Jonathan Swift, who wrote scores of books, was paid?

Gulliver's Travels. Its title was originally *The Travels into Several Remote Nations of the World by Lemuel Gulliver.*

The book was so well presented with an illustrated portrait of Gulliver and maps, that many credulous people believed it to be a true story. Indeed, a bishop in Ireland angrily asserted that in his opinion it was full of improbable untruths to such an extent that he scarcely believed a word of it.

The book is popularly regarded today as a children's classic but in fact it was published as an adult book, packed with bitter satire, ridiculing the society of the day.

Jonathan Swift, who was born in Dublin, November 30, 1667, was ordained a priest in 1695 but soon tired of a country parson's life.

He commenced to write poetry but his verse was harshly criticised and he turned his attention to the shortcomings of the day's politics. With wit and savagery he attacked the accepted customs of the land and made the church the particular target for his wicked humour.

Always outrageous in his attacks, he at long last, in 1741, became completely insane and died October 19, 1745. He was buried in St Patrick's Cathedral, Dublin.

Which french poet was the hero of the very popular operetta *The Vagabond King?*

He was Francois de Montcorbier, known as Villon, born in 1431. His father died when he was quite young and he was brought up by a relative, Guillaume de Villon, whose name he adopted. He was educated at the University of Paris from where he graduated in 1449.

He soon fell into bad company and roistered through the seedy taverns of Paris with thieves and murderers. He was himself charged with murder when on June 5, 1455, he quarrelled with and mortally wounded a priest. He fled from Paris. Later he obtained a letter of remission due to the pleading of some more lawabiding friends.

He continued his wayward and dishonest life and was concerned in a serious theft of money from the College of Navarre.

Guy Taberie, who was a member of the gang of thieves, betrayed Villon who promptly ran away from Paris yet again.

He suffaced eventually in Blois in 1457 where he took part at the court of Duke Charles d'Orleans in a poetical competition. Next heard of in prison at Meung-sur-Loire, he only escaped hanging because a general amnesty was proclaimed when King Louis XI and his court passed through that town.

Back in Paris, he was accused once again of theft and thrown into prison but released. Soon, in further trouble, he was re-arrested and condemned to death. He appealed and the sentence was commuted to one of banishment for ten years. Nothing more is known of him.

It cannot be denied that Villon was certainly not the heroic figure he cuts in the musical play *The Vagabond King* but the bitter beauty of his verse - in fact his output was quite small - has been admired across the centuries. At the request of his mother, he wrote, in the form of a ballad, a prayer to the Virgin Mary which is touching and beautiful.

Who - when asked by a customs officer "What have you to declare?" replied "Only my Genius."?

Oscar Wilde, the Irish poet and playwright. He was born in Dublin October 15, 1856, the younger son of Sir William Wilde, a surgeon.

A master of deadly witticisms, Oscar Wilde wrote many famous plays such as *An Ideal Husband* and *Lady Windermere's Fan*. He also wrote children's fairy tales.

He died November 30, 1900.

Three Men In a Boat **is one of very few humorous classics but who wrote it?**

It was written by an actor, ex-schoolmaster and clerk in the City of London. His name was Jerome Klapka Jerome, born at Walsall, near Wolverhampton, May 2, 1859.

Turning to literature, his first book was *On the*

Stage and Off, published 1885, an account of his theatrical adventures. Four years later his masterpiece *Three Men in a Boat* appeared. It received immediate wide and prolonged popularity. Jerome later wrote some plays of which *The Passing of the Third Floor Back* is the best known.

He died June 14, 1927.

Who wrote the two baffling mystery novels, *The Woman in White* and *The Moonstone* ?

William Wilkie Collins who was the son of William Collins, the painter. Born in London, January 8, 1824, he studied law and was called to the Bar in 1851. He was already writing and in 1850 his novel *Antonina* had appeared but his high rank in literature stands on his two well-known mystery novels.

Wilkie Collins was a close friend of Charles Dickens who admired his writing and helped him to strengthen his characterisation.

Collins died in London on September 23, 1889.

When Sir Walter Scott was made bankrupt, how did he pay off his debts?

In his own words "This right hand shall work it all off."

In 1809 he had supplied half the capital of the publishers, Ballantyne & Co. Although he made a lot of money from his poems and books, he spent much of it on building his home, Abbotsford. In 1826 Ballantyne were in very serious financial difficulties and Scott had not enough cash left to save the company from bankruptcy.

At the age of 55, with outstanding debts of £ 250,000, an enormous sum in those days, Sir Walter bravely wrote as much and as fast as he could to pay off the creditors.

The strain at last began to tell. In February 1830, he had an attack of apoplexy. In spite of this, he continued to write and completed his last two novels, *Castle Dangerous* and *Count Robert of Paris* in 1831.

The following year, having suffered another severe attack of apoplexy, he died at Abbotsford, on September 21, 1832.

Ivanhoe, having been the subject of more than one successful film, is probably his most famous book.

First Impressions was the title Jane Austen gave to her first book but under what title was it published?

Jane Austen completed her first novel in 1797 when she was 22 years old. It was published 16 years later when it appeared as *Pride and Prejudice. First Impressions* was not her first book to be published for that was *Sense and Sensibility,* published in 1811.

Jane Austen was born December 15, 1775, at Steventon rectory in Hampshire, the seventh and youngest child of the Rev George Austen. His salary was not sufficient to raise so large a family so he accepted pupils to learn music, dancing, French and a little Italian. Jane took her place with the other pupils.

From 1801 to 1805 her home was in Bath. Then the family moved to Southampton and later to Chawton in Hampshire. Devoted to her family, she lived her whole life with them, apart from occasional visits to London and during her last illness in the town of Winchester where she died July 18, 1817. She never married although it is said she was once in love with a man who died young.

All her writing was carried out in the family's sitting room, subject to casual interruptions.

Her other novels apart from *Sense and Sensibility* and *Pride and Prejudice* were *Mansfield Park, Emma, Northanger Abbey* and *Persuasion,* the last two being published after her death. She left an unfinished book entitled *Sanditon.*

Who wrote the book on which the world's most popular opera was based?

Prosper Merimee wrote *Carmen,* the novel that attracted the attention of Georges Bizet, the composer.

Merimee was born September 28, 1803, in Paris. He grew up a melancholy man of sensitive temper and a great writer of imaginative prose.

He died September 23, 1870.

The Virginian has been often filmed but who wrote the book?

Owen Wister, who, like several other writers, first studied the law.

Born at Philadelphia, July 14, 1860, he became a barrister in 1889 but he abandoned the law to write books. He excelled in stories of the West and is regarded as the writer who laid the foundations of the later form of cowboy stories.

The Virginian has been filmed for the cinema screen and a long television series was based on it.

The contemporary accounts of Julius Caesar's wars in Gaul and Britain were written by whom?

By Julius Caesar himself. As a man of letters, Caesar stands in the highest rank. Regrettably the only works of his that have come down to us are his famous commentaries on the Gallic war and Civil war.

His accounts of his campaigns reveal the brilliant genius that certainly made him one of the greatest warriors of all time.

Who is Ian Fleming's famous hero, featured in many films?

James Bond. Ian Fleming introduced Bond in his novel *Casino Royale* which was first published in 1953.

Ian Fleming was born May 28, 1908 and educated at Eton College and then the military academy, Sandhurst.

He worked with the well-known news agency Reuters and later as the foreign manager of a newspaper combine. Among his other Bond novels are *Live and Let Die, Diamonds are Forever* and *On Her Majesty's Secret Service.* Successful James Bond films, often seen on television today, are *Dr No, From Russia with Love, Goldfinger,* and *Thunderball.*

Young readers know Ian Fleming best as the author of *Chitty-Chitty-Bang-Bang,* the amazing automobile which can fly and turn itself into a hovercraft. It is the brain-child of a brilliant inventor, Commander Caractacus Potts. One of his other clever ideas is sweets that whistle.
Fleming died August 12, 1964.

Who was the French Forest Ranger famous for his fables?

His name was Jean de la Fontaine. His father was the ranger of the forest of the duchy of Chateau-Thierry in Champagne. Jean was born there July 8, 1621, and educated at first for the Church. He turned, however, to the law but abandoned this on succeeding to his father's rangership in 1647.

He married the same year but soon separated from his wife and he must have decided that forest ranging was not for him for it is known that from 1660 he lived in Paris. He began to write verses and translated some of the minor classics.

In 1668 his first six books of animal fables were published. In wonderfully easy verse, they rate high among the glories of French literature. In them Fontaine demonstrated a deep knowledge of nature, gained probably from the days when he roamed the forest of Chateau-Thierry as a ranger.

A second series of fables appeared in 1679 and a third in 1693. They are today still read extensively throughout the world.

Jean de la Fontaine died in Paris April 13, 1695.

Did Rob Roy Really live?

Yes, He was Robert MacGregor, the leader of a band of Scottish outlaws. Sir Walter Scott featured him in a heroic role in his popular novel *Rob Roy*. MacGregor called himself Rob Roy, roy meaning red. Rob Roy had red hair. He was born 1671, in Buchanan parish, Stirlingshire. As a cattle farmer at Balquhidder, he raised a band of armed men, who also guarded the herds of neighbouring farmers on payment of a tax.

Unable to repay a loan made to him by the Duke of Montrose, he was in 1712 evicted by the duke from his estates and outlawed. At the head of a band of followers, he raided the estates of the duke and his tenants, defying all attempts to capture him.

Which poet Laureate was said to have worked himself to death?

Robert Southey was born at Bristol, August 12, 1774. When he was 20 years old, the French Revolution was in full swing and Southey was so inspired by this that he stupidly conceived the idea of founding a communal republic in the United States. He was ably abetted in this notion by Samuel Coleridge, also a poet. The two young men (Coleridge was 22) worked together and Southey began to publish his early verse and prose in an attempt to raise the funds for this useless enterprise. Eventually, the young poets realised the futility of the project and abandoned it.

Thereafter, Southey devoted himself continually to hard work and he turned out immense amounts of books and poems. Finally the years of continuous over-work took their toll. His health was seriously affected and he became insane. He died March 21, 1843.

Today, in spite of all his hard work, he is remembered only for his *Life of Nelson* and a few ballads such as *The Battle of Blenheim* and *The Inchcape Rock.*

In later years he cast aside his earlier republicanism, became a Tory and was appointed Poet Laureate in 1813.
He at last made friends with Montrose but he was still an outlaw. In 1722 he surrendered to the English and was taken to London to Newgate Prison.

He was sentenced to be transported but in 1727 was pardoned. Rob Roy MacGregor, regarded by many as the "Robin Hood of Scotland," died December 28, 1734.

Rob Roy is not only a wellknown novel. A very successful film was made about the notorious outlaw by Walt Disney Productions.

Whose novel about English Country life was praised by a British Prime Minister?

Mary Webb was born at Leighton, Shropshire on March 25, 1881. Her family name was Meredith and in 1912 she married a school-master, Henry Bertram Webb.

In 1914 Mr and Mrs Webb began work as market gardeners and sold their fruit and vegetables on a stall in the market place of Shrewsbury Town.

Mary Webb started journalistic work at an early age while living in Shropshire. Her first novel *The Golden Arrow* was published in 1916. After that came *The Spring of Joy. Gone to Earth, The House in Dormer Forest* and *Seven for a Secret.*

It was not, however, until 1924 when her best-selling *Precious Bane* appeared that she first attracted attention. It was awarded an important prize specially given annually for the best novels or verse descriptive of life in England, written by an author who had not yet acquired any outstanding success.

Stanley Baldwin, at that time Prime Minister of Britain, wrote an introduction to the book; and addressed it from No 10 Downing Street, London the residence of Britain's premier. The praise he deservedly lavished on the book in his introduction ensured its continuing popularity.

Sadly, Mary Webb did not live long to enjoy her well-won success. Her last book *Armour Wherein He Trusted* was published in 1926 and she died at the height of her fame October 8, 1927.

Her books excel in the vivid descriptions of the dour countryside of Shropshire and the Welsh Marches, threaded throughout by a certain wildness and fateful mystery.

Precious Bane has been featured as a television serial and *Gone to Earth* was filmed in 1948

By which name do we know Theodor Jozef Konrad Korzeniowski?

The name under which he wrote his many sea-faring novels was Joseph Conrad. He was born in the Ukraine in Russia on December 6, 1857. His boyhood was passed in Cracow in Poland. There he learned to speak and write French fluently and first began to take a great interest in the sea.

At the age of 17 he served for two years in French ships in the Mediterranean Sea and on South American coasts. Four years later he forsook his interest in France and instead turned to England and took passage to Lowestoft on the east coast of England. He landed there in 1878 and later qualified as an able seaman.

He served on a coasting vessel. He sailed as third mate to Sydney, Australia, on a sailing ship in 1880. Four years later, he became a master in the British merchant service and took British citizenship. Conrad left the sea in 1894 and after his marriage in 1896 settled in Kent.

He fell ill of Congo fever and, during his convalescence, started work on his first novel, entitled *Almayer's Folly*. He worked on this book for nearly five years.

He wrote many books about the sea, prominent among which are *Victory, An Outcast of the Islands* and *Lord Jim,* all of which have been filmed.

Joseph Conrad died August 3, 1924.

What are the first and last sentences in the Bible?

The first book of the Bible is Genesis and the first words are "In the beginning God created the heaven and the earth." The last book in the Bible is Revelations and the last words read" The grace of our Lord Jesus Christ be with you all. Amen."

Who gave four white feathers to Harry Faversham?

Harry Faversham is the hero of the novel *The Four Feathers* which was written by Alfred Edward Woodley Mason and first published with great success in 1902.

When the story starts Harry Faversham is a young officer in the British army. He is tired of army life and wishes to settle down and marry his fiancee, Ethne Burroughs. Harry is forced to consider his future as an army officer when his regiment is posted to the African country of the Sudan to take part in the campaign that is being fought there.

On the very eve of the regiment's departure, Harry resigns his commission, much to the disgust of his fiancee and his three fellow officers, Captain John Durrance, Lieutenant Thomas Willoughby and Lieutenant Peter Burroughs, Ethne's brother. Later Harry is given four white feathers (a white feather being the symbol of cowardice) by Ethne and the three officers.

How Harry sails for Egypt to rescue his three officer friends from great danger and redeems himself in the eyes of his fiancee makes for a most exciting novel. He returns the four feathers to Ethne and his three friends and all ends happily in the tradition of adventure books of this type.

A E W Mason, who wrote the book was born May 7, 1865 and scored his first publishing triumph with *The Courtship of Morrice Buckler* in 1896.

Books of his, such as The House of the Arrow, At the Villa Rosa, and *The Four Feathers, were filmed, the last, the most popular, at least three times.*

Perhaps it is worth mentioning that "Alf Mason" is one of Captain Hook's pirates in *Peter Pan* which was written by Mason's good friend, J M Barrie.

A E W Mason died November 11, 1948.

Is there any connection between Captain Blood and Colonel Blood?

No. Captain Blood is a fictional character, the hero of Rafaël Sabatini's novel of piracy on the high seas *Captain Blood* while Colonel Blood was the real-life rascal who stole the crown jewels from the Tower of London May 9, 1671. He was captured but later pardoned by King Charles II.

Rafael Sabatini was born of Italian and English parentage at Jesi, Italy in 1875 and first made his name as a writer of historical fiction with *The Tavern Knight,* in 1904. This was followed by a long series of similar tales that enjoyed great popularity for their historical accuracy and the author's charm of style.

His books, *The Sea Hawk, Captain Blood, Scaramouche* and *Bardelys the Magnificent,* have all been rendered into outstandingly successful films.

Rafael Sabatini also wrote the biographical works, *Life of Cesare Borgia* and *Torquemada and the Spanish Inquisition.*

He died February 13, 1950.

Who wrote *The One Hundred and One Dalmatians?*

Dorothy Gladys Smith, better known as Dodie Smith and in theatrical circles by her pen-name CL Anthony. She was born May 3, 1896 at Whitefield, Lancashire and educated at Manchester and at St Paul's Girls' School in London.

After studying at the Royal Academy of Dramatic Art, she first appeared on stage in musical comedy in 1915. After several years touring with various companies, she left the stage to go into business. Her first play, *Autumn Crocus,* was produced at the Lyric Theatre, London, in 1931 and was an immediate success. In 1932 her second play *Service* was produced at Wyndham's Theatre. Both these plays have been filmed.

The One Hundred and One Dalmatians was also filmed but as an animated cartoon feature in 1961 by Walt Disney Productions. She wrote this in 1956 and then in 1967 another children's book, *The Starlight Barking* was published to be followed by yet another, *The Midnight Kittens* in 1978.

Who was Shere Khan?

In Rudyard Kipling's *Jungle Book,* Shere Khan is a tiger, the deadly enemy of Mowgli, the story's hero.

In which two books by Robert Louis Stevenson is David Balfour the Hero?

Kidnapped and *Catriona.*

The English Poet who wrote *La Belle Dame Sans Merci* died when he was only 26. who was he?

John Keats (1795-1821). He died in Rome and is buried there.

What were the Christian names of the three Bronte sisters?

Charlotte, Emily and Anne.

Who wrote the famous Biography of Dr Samuel Johnson?

James Boswell, friend and travelling companion of Johnson.

To whom in the Bible did Jesus say: "Fear not, Henceforth thou Shalt Catch Men"?

Peter, the disciple.

Lord Byron Enlisted in a Foreign Army and died later in the Army's Country. What Country?

Greece.

What are the names of the Fairy King and Queen in Shakespeare's play *A Midsummer Night's Dream?*

Oberon and Titania.

What was Thomas Hardy's First Profession?

At the age of 16 he was apprenticed to an architect and later worked for an architect in London.

What did Wynkyn de Worde do?

He printed books. His real name was Jan van Wynkyn. He assisted William Caxton and in 1491 succeeded him.

Who were the two men who went round the world in eighty days in Jules Verne's Great Book?

Phileas Fogg and his manservant, Passepartout.

Who wrote the book on which Walt Disney's film *The Sword and The Stone* is based?

Terence Hanbury White (1906-1964).

What famous Battle Described in William makepeace Thackeray's Novel *Vanity Fair?*

Waterloo.

Who wrote *The Canterbury Tales?*

Geoffrey Chaucer (1340?-1400), spent most of his life working for the monarchy. He served under Edward III, Richard II and Henry IV.

Which King of Great Britain wrote a book about tobacco?

King James the First.

Which was the book hailed as "The best book about Wales" ever published?

This was George Borrow's *Wild Wales, its People, Language and Scenery* which was published in 1862. It was the popular journal *The Spectator* which printed this well-earned praise.

Which Poet was Oliver Cromwell's Secretary for Foreign Tongues?

John Milton.

What film-of-the-book won nine Awards by the Academy of Motion picture arts and Sciences in 1939?

This was *Gone With The Wind* by Margaret Mitchell. The awards it received were as follows: Best production, Clark Gable for best actor, Vivien Leigh for best actress, Hattie McDaniel for best supporting actress, direction, best-written screenplay, cinematography (colour), art direction, and film editing.

What are the names of the three boys in the novel *The Coral Island* and who wrote it?

The boys' names are Ralph, Jack and Peterkin and the book was written by Robert Michael Ballantyne (1825-1894).

In the Bible what are the names of the three wise men?

Balthazar, Caspar and Melchior.

Who Created Mary Poppins?

Pamela Lyndon Travers, born in Australia in 1906. She was convalescent after an illness when she wrote the first Mary Poppins stories.

Who lived at Dove Cottage in the English Lake District?

William Wordsworth (1770-1850), famous for his poems on nature.

What was Richard Henry Dana's most famous book?

R H Dana (1815-1882), was an American author and lawyer. His best-known book is *Two Years Before the Mast.*

Who wrote the words of *Rule Britannia?*

James Thomson (1700-1748), who was a famous British dramatist and poet. Thomas Arne (1700-1778), was responsible for the stirring music.

What was Bram Stoker's most famous book?

Dracula. Born Abraham Stoker in 1847, he wrote many novels and short stories now largely forgotten. He died in 1912.

Ginger and Merrylegs Appear in which book by Anna Sewell?

Black Beauty. They are two horses, friends of Black

Beauty.

In whose book does a female vampire appear?

Joseph Sheridan Le Fanu (1814-1873) wrote *In A Glass Darkly* in which appears the short story *Carmilla,* who is the vampire. It appeared 25 years before *Dracula* was published.

Who created Sherlock Holmes?

Fiction's most famous detective was created by Sir Arthur Conan Doyle. Born in Edinburgh in 1859 he decided to become a doctor, and it was when he was studying medicine at unversity that he met the man who was to later inspire him to create his most famous character. The man was his professor, Joseph Bell, who was particularly good at finding out not only what ailed his patients but, through careful observation, details of their character, job and circumstances. It was his powers of 'deduction' that so impressed Conan Doyle and inspired him to create his famous detective.

In 1887 Conan Doyle published his first Sherlock Holmes book, *A Study in Scarlet,* featuring the super-sleuth and his friend Dr Watson, and in the years that followed many other books and short stories appeared, all eagerly awaited by Holmes' growing army of devotees. In fact, Conan Doyle somewhat resented the popularity of the Holmes stories, for he believed that his other work was equally as good, though not nearly so popular with the public. He tried to kill off Holmes in one story, but there was such an uproar that he was forced to bring the detective back for more adventures.

Although a successful writer, Conan Doyle continued to practise medicine, going to South Africa during the Boer War to treat injured troops, and he did some real-life sleuthing, too, championing those he believed had been wrongly convicted or badly treated. He was knighted in 1902.

Incidentally, the phrase that has come to be associated with Holmes - "Elementary, my dear Watson!" - does not appear in Conan Doyle's work!

Who was Mark Twain?

Mark Twain was the pen name chosen by Samuel Langhorne Clemens, author of favourites like *The Adventures of Tom Sawyer. The Adventures of Huckleberry Finn. Life on the Mississippi* and *The Prince and the Pauper.*

After working as a printer and a Mississippi pilot, he turned to writing, telling with charm and humour of the American people and places he knew best, and creating, in Tom Sawyer and Huckleberry Finn, two of the best-loved young rogues in literature. He died in 1910, aged 75.

Mark Twain took his pen name from the Mississippi river pilots' jargon: 'by the mark twain', meaning two fathoms depth by the sounding line.

Who wrote The Wind in the Willows?

It was whilst he was still working as a Bank of England official that Kenneth Grahame published his first work, and it was when he was fifty-nine years old that his masterpiece appeared. He originally wrote *The Wind in the Willows*, a charming animal fantasy, for his young son, but it soon became a best-seller, and has remained so to this day.

FASCINATING FACTS

FIFTY FASCINATING FACTS

Beware of the bull

A bull's front legs are shorter than its back ones, enabling it to run faster going uphill than down.

Pampered Pussy

Rather than tempt fate, when a party of thirteen arrives at the Savoy Hotel, London, for dinner, an extra place is laid for the hotel cat.

Hello, XLZPTZ speaking

There is enough telephone cable under New York to reach Venus.

Cheeky Monkey

An art student in Pretoria who submitted a chimpanzee's pictures instead of his own was awarded a pass mark by examiners.

Bare-Faced Piggery

At the turn of the century, a shaved bear dressed in female clothing was exhibited as 'The Pig Woman', a fortune-teller whose grunted replies were prompted by a man beneath the table with a sharp stick.

Fish and Chips

In Las Vegas some casinos have floating gambling tables in the swimming pools.

You only live once

There is enough explosive on earth to wipe out mankind 50,000 times.

Gallon of ink, please

In pence to the mile, it is cheaper to run a motorbike than a ballpoint pen.

Deep freeze

A lizard discovered inside a block of a ice buried 33 ft below ground level in Siberia, was found to be alive.

Going up

The three astronauts who spent twelve weeks in space on the Skylab mission had grown two inches taller by the time they returned to Earth.

Sweet teeth

One third of the world's boiled sweets are eaten in Britain.

Old School Ties

Eighteen of the forty-six Prime Ministers to govern Britain went to Eton.

Armless depression?

Squids in captivity often commit suicide by eating their own tentacles.

Open house

2,500 pints of beer are sold in the House of Commons bar in London every week.

Birth pains

Although the kiwi and the hen are virtually the same size, the kiwi's egg is eight times bigger. Kiwis are the only birds to hunt by smell.

Zip!

If all the zips on earth were laid end to end they would reach to the moon and back twice.

Passing fancy

Inmates who escaped from Sing Sing prison could rely on a change of clothes at the home of millionaire Whitelaw Reid, who kept two suits hanging in an outside barn for that purpose.

Unsteady as she goes

In 1590 the Royal Navy beer ration was one gallon per sailor per day. In 1731 sailors had the choice of half a pint of rum or a pint of wine.

Give generously

Duelling in Uruguay is legal only on one condition - that both parties are registered blood donors.

Beware of the bear

When Lord Byron was at Cambridge there was a rule forbidding students to keep dogs in their rooms. Byron kept a bear.

Dollar wise

Anyone wise enough to invest one dollar at 4 per cent compound interest on the day Jesus was born would now be worth the equivalent of one hundred solid gold balls, each one a thousand times as big as the earth.

Peace on earth

Just under three quarters of the earth's population live without radio, television, newspapers or telephones.

Progress

The life expectancy of Swedish men and women is 71.7 years and 75.5 years respectively, the highest of all civilised countries and virtually the same as that of Australian Aborigines.

Colourful World

Apart from humans, monkeys are the only mammals capable of distinguishing different colours.

Ready for bed

The average double bed requires four miles of walking and 25 hours work per year.

Light snack

Frank Reese, a prisoner in a Texas jail, was responsible for a huge turnover in lightbulbs. He had been eating them. Pressed for a demonstration by television reporters, Frank downed fourteen bulbs and the sheriff's sunglasses.

Silent majority

There are thirty dead people for every one living on earth.

Thermometers Obsolete?

If you count the number of times a cricket chirps in one minute, subtract forty, divide by four and add fifty, you'll find the temperature Fahrenheit.

Stop Emigration

More people emigrate from the United Kingdom than from any other country.

Weighty Matter

A scientist who weighed people immediately before and after death concluded that the human soul weighs 21g.

Frozen Food

A giant hailstone that landed in Essen, Germany, had a carp frozen inside it.

Roaring exports

Lions from Windsor Safari Park in England have been exported to Africa.

Strict upbringing

Young men in Malagasy Indian tribes must pay their fathers for the right to grow taller than them. While their fathers are alive they cannot shave or eat animal rumps.

Vampires take note

American doctors in Florida have noticed that when the moon is in its second quarter some patients bleed up to twice as much during operations.

No guarantee

A Nigerian witch doctor who shot dead a prospective customer while demonstrating a bullet proof charm was sentenced to death in 1972.

Fish and Ships

Fish kept on board ships get seasick.

Equal pay

Minstrels at the court of King Henry V were paid one shilling per day, the same as the Royal surgeon.

Say cheese

Spacemen visiting other planets would do well not to smile. The smile is the only gesture man does not share with other earth animals. To most mammals, baring the teeth is an act of aggression.

Larger than life

Western sets in old Hollywood movies were built smaller than in real life to make the cowboys look big.

Vintage stuff

The word vinegar comes from the French vin aigre, meaning sour wine.

Not Cats and Dogs

During a freak storm in France, thousands of small toads rained down on the startled population.

Spider dressing

High-class barbers in Roman times used to dress the cuts of their clients with spiders' webs soaked in vinegar.

Early Start

Female children in the Tiwi Islands in the Pacific are engaged before they are born. They are married at birth to the adult of their parents' choice.

Wet lot

The average American uses sixty gallons of water every day.

Super tankers

The rudder of a giant oil tanker could provide parking space for nearly fifty cars if laid on its side.

Windy

Workers on Japanese building sites sometimes use kites to carry bricks up tall buildings.

Slow risers

Some species of snail have been known to sleep continuously for four years.

Thick-Skinned

Although toads are capable of surviving 10,000 mg. of fluoracetic acid, as little as 1 mg. will kill a dog.

Museum Piece

A coin described as a 'Roman sesterce coin from between 135 and 138 A.D.' was removed from display when a nine-year-old boy recognised it as a plastic medallion given away with bottles of pop.

Who knows what?

The average woman's brain weighs around 4 oz lighter than a man's. The brain of Neanderthal man was bigger than both.

QUIZ

I

COUNTRIES

1. **Which country has been called 'the gift of the Nile?**
2. **Which country's name means equater?**
3. **Which British colony will be returned to China in 1997?**
4. **Which country is also the world's largest archipelage?**
5. **Which is the world's only officially atheist country?**
6. **Which African country had the same name as its neighbour until 1971?**
7. **Which country has more than 55,000 lakes?**
8. **Which country is named after a tree?**
9. **Which country is officially called the Hellenic Republic?**

ANSWERS

1. Egypt.
2. Ecuador.
3. Hong Kong
4. Indonesia.
5. Albania.
6. Zaire (formerlyCongo).
7. Finland.
8. Brazil (brazilwood).
9. Greece.

II

GEOLOGY

1. **What do geologists call molten rock inside the Earth?**
2. **What do geologists call streams of molten rock that spill out of volcanoes?**
3. **What is the name for fractures (breaks) in rocks along which the rocks have moved?**
4. **What icicle-like rock structures hang down from the roofs of limestone caves?**
5. **What are cracks in the surface of glaciers called?**
6. **What porous volcanic rock floats on water?**

ANSWERS

1. Magma.
2. Lava.
3. Faults.
4. Stalactites.
5. Crevasses.
6. Pumice.

III

PLANETS

1. **Which is the smallest planet in the solar system?**
2. **Which planet is called the Red Planet?**
3. **Which planets have no moons?**
4. **Which planet is named after the god of the sea?**
5. **Which planet appears as the brilliant morning or evening 'star'?**
6. **Which is the only planet not mentioned in Holst's Planets suite?**

ANSWERS

1. Pluto.
2. Mars.
3. Mercury and Venus.
4. Neptune.
5. Venus.
6. Pluto (it was not discovered until 1930, after the music was written).

IV

CITIES

1. **Which city is called the Big Apple?**
2. **What is the diamond capital of the world?**
3. **Where is the Venice of the North?**
4. **What is the world's highest national capital city?**
5. **What is the Eternal City?**
6. **Which city is called 'Australia's front door'?**
7. **Which city is called the 'Windy City'?**
8. **Which former capital was called the 'Forbidden City'?**
9. **Where is the Granite City?**

ANSWERS

1. New York City, USA.
2. Kimberley, South Africa.
3. Stockholm, Sweden.
4. La Paz, Bolivia.
5. Rome, Italy.
6. Darwin, Australia.
7. Chicago, USA.
8. Lhasa, Tibet.
9. Aberdeen, Scotland.

V

THE WEATHER

1. What instruments are used to measure air pressure?
2. What is the name for a high air pressure system?
3. What do we call a low air pressure system?
4. What instruments are used to measure wind speeds?
5. What scale is used to classify wind speeds?
6. What do meteorologists (*people who study the weather*) call a thundercloud?
7. What is the name for charts that show weather conditions at a particular time?
8. What do we call invisible moisture in the air?

ANSWERS

1. Barometers.
2. Anticyclone.
3. Depression or cyclone.
4. Anemometers.
5. Beaufort scale.
6. Cumulonimbus.
7. Synoptic chart.
8. Water vapour.

VI
MINERALS

1. What mineral feels soapy to the touch?
2. What is bauxite?
3. What minerals is used to make Plaster of Paris?
4. What types of the hard mineral corundum are prized as gemstones?
5. What is the name for bits of magma, ranging from volcanic dust to loaf-sized volcanic bombs, that are hurled from volcanoes?
6. What sedimentary rock consists mainly of worn fragments of quartz?
7. What rock is formed when limestone or dolomite are subjected to great heat and pressure?
8. What instrument is used to locate radioactive minerals?
9. What mineral tastes salty?

ANSWERS

1. Talc (or soapstone).
2. Aluminium ore.
3. Gypsum.
4. Ruby and sapphire.
5. Pyroclasts.
6. Sandstone.
7. Marble.
8. Geiger counter.
9. Halite (or rock salt).

VII

ASTRONOMY

1. What is an astronomical unit?
2. Can you see farther during the day or at night?
3. Which star is called the Dog Star?
4. Which constellation is known as the bull?
5. What type of telescope collects light with a mirror?
6. What creature is represented by the constellation Cygnus?
7. What caused the Crab nebula?
8. Which constellation contains the stars Castor and Pollux?

ANSWERS

1. The distance from the Earth to the Sun, 150 million km (93 million miles)
2. At night.
3. Sirius.
4. Taurus.
5. A reflector.
6. A swan.
7. A supernova.
8. Gemini, the twins.

VIII

FOSSILS AND PREHISTORY

1. In what type of rock are fossils most common?
2. What was the largest flesh-eating dinosaur?
3. What fake 'human fossil', made up of a human skull and an orang-utan's jawbone, fooled scientists between 1912 and 1929?
4. What is the name of the earliest known bird?
5. What is the name of the dog-like ancestor of the horse which lived in the early Eocene epoch?
6. What was the heaviest known dinosaur?
7. In what transparent substance were insects often fossilized?
8. What do we call the study of fossils?
9. What are the oldest rocks in Earth history in which fossils are common?

ANSWERS

1. Sedimentary rocks.
2. Tyrannosaurus rex.
3. 'Piltdown Man'
4. Archaeopteryx.
5. Eohippus.
6. Brachiosaurus.
7. Amber (hardened resin).
8. Palaeontology.
9. Cambrian rocks.

IX

OCEANS AND SEAS

1. **What is the name for the shallow areas around continents?**
2. **What do we call (a) the highest and (b) the lowest tidal ranges?**
3. **What two elements give seawater a salty taste?**
4. **What are the deepest parts of the oceans?**
5. **What craft was used by Jacques Piccard and Donald Walsh in the record descent of 10,917 m (35,817 ft) into the Marianas Trench?**
6. **What instruments are used to map the ocean floor?**
7. **What is the cause of surface ocean currents?**
8. **What ocean current moderates the weather in north-western Europe?**

ANSWERS

1. Continental shelves.
2. (a) spring tides; (b) neap tides.
3. Sodium and chlorine.
4. Ocean trenches.
5. US bathyscaphe Trieste.
6. Echo sounders.
7. Winds.
8. The Gulf Stream (and its extension, the North Atlantic Drift).

X

INSECTS

1. How many species of insect are there in the world today?
2. Which is the world's heaviest insect?
3. How fast can a honey-bee fly: is it 8 km/h (5mph); 11 km/h (7mph); or 16 km/h (10 mph)?
4. What types of insects are the painted lady, the Camberwell beauty and the common skipper?
5. What sort of insect does a leatherjacket turn into?
6. Which insect swims upside down on its back?

ANSWERS

1. Over one million have been identified and named. Many scientists believe there could be as many as two or three million other species not yet discovered.
2. The African goliath beetle. It weighs 100 g (3 1/2 oz) and measures upto 11 cm (4 1/4 in).
3. 11 km/h. (7 mph).
4. They are all butterflies.
5. A type of beetle.
6. The water boatman.

XI

TERMITES

1. **What are termites?**
2. **How many species of termite are there? Is it 6,000, 8,800 or 1,700?**
3. **How high is the biggest termite mound?**
4. **Do any animals eat termites?**
5. **Where do termites live?**

ANSWERS

1. Termites are pale, soft-bodied, ant-like social insects which comprise the order Isoptera. Termite colonies consist of workers, soldiers, reproductives, a king and a queen.
2. 1,700.
3. The mounds, or nests, of the Australian termite Nausutitermes may be over 8 m (26ft) high.
4. The giant anteater of South America is a particularly important predator of termites. It rips termite mounds open with its strong, hooked claws and licks up the termites, using its long, sticky tongue. Some birds also feed on termites occasionally.
5. Termites are found mainly in the tropics,and the continents of North America, Australia, Africa and South America.

XII

MAMMALS

1. **What is the heaviest land mammal?**
2. **How many species of mammal are there in the world: 2,500, 4,500, 8,500, or 14,000,?**
3. **How do you tell the difference between a black rhinoceros and a white rhinoceros? (Clue: it's nothing to do with the colour)**
4. **Which mammals lay eggs?**
5. **Which is *the fastest* land mammal?**
6. **Which mammal is man's closest relative: chimpanzee, gorilla or orang-utan?**

ANSWERS

1. The African elephant, which may weigh upto 12 tonnes.
2. There are about 4,500 species of living mammals.
3. Look at their top lips. The white rhinoceros has a square-shaped lip, and the Black rhinoceros has a triangular-shaped lip. In fact, the 'white' rhinoceros is so-called because the word 'white' is a misuse of the Afrikaans word wijd, or 'wide', which describes the shape of the top lip.
4. The platypus, and the spiny anteater or echidna.
5. The cheetah. It can attain speeds of 96 Km/h (60mph) for short distances.
6. The chimpanzee.

XIII
REPTILES

1. **All lizards are non Poisonous True or false?**
2. **What is a slow-worm?**
3. **Which snake can raise a 'hood' behind its head?**
4. **How do boas and anacondas kill their prey?**
5. **What are terrapins?**
6. **To which group of reptiles do caimans belong?**

ANSWERS

1. False. There are two species of Poisonous, lizard: the gila monster of southern USA and the bearded lizard of Mexico.
2. The slow-worm is not really a worm at all, nor is it particularly slow. It is a variety of lizard, but it has no legs.
3. The cobra.
4. They kill their prey by squeezing or constricting it.
5. Terrapins are aquatic reptiles related to tortoises.
6. Caimans belong to the group called the crocodilians, which also includes the crocodile, alligator and gharial.

XIV

FISH

1. **What is the biggest fish in the world?**
2. **Of which species of fish is the goldfish an ornamental variety?**
3. **Why does a shark sink when it stops swimming?**
4. **Which fish uses a fishing rod to catch its prey?**
5. **How many eggs does a sturgeon lay, and what do we call the eggs when we eat them?**
6. **Name the 'living fossil' first discovered in 1938.**

ANSWERS

1. The 43 tonne, 18.5 m (60ft) long whale shark.
2. The common carp.
3. Because it has no swim bladder, the buoyancy organ found in other types of Fish.
4. The angler fish.
5. Upto 2.5 million. They are eaten as caviar.
6. The coelacanth.

XV

FLIGHT

1. How fast does a stooping (or swooping) peregrine travel?
2. A hoverfly can fly backwards as well as forwards: true or false?
3. A flying squirrel can perform flapping flight: true or false?
4. How far does a willow warbler travel in a year?
5. Name the large, flightless bird of Australia.
6. How many primary feathers are there on a duck's wing: 5, 10, 20 or 25?

ANSWERS

1. 362 km/h (225 mph).
2. True. Sideways too!
3. False. It can only perform gliding flight.
4. At least 16,000 km (9,600 miles) from northern Europe to southern Africa and back.
5. The emu.
6. 10.

XVI

BIRDS

1. Which is the heaviest flying bird?
2. Which bird lays the smallest egg?
3. Which is the heaviest flightless bird?
4. Where do penguins come from-North Pole or South Pole?
5. What is the earliest known bird called?
6. What sort of bird is a saddlebill?

ANSWERS

1. The mute swan. It weighs over 18 Kg (40 lb).
2. The bee hummingbird. It lays eggs into a nest no bigger than a thimble.
3. The ostrich. The ostrich of the grasslands of Africa and Arabia may weigh over 150 Kg.
4. South Pole.
5. Archaeopteryx.
6. A type of stork.

XVII

AMPHIBIANS

1. **Which is the world's largest amphibian?**
2. **How do you tell the difference between frogspawn and toadspawn?**
3. **What is an axolotl?**
4. **How far can a frog jump?**
5. **How many species of newt live in Britain?**
6. **Why is the midwife toad so called?**

ANSWERS

1. The giant salamander, which grows to a length of 1.5 m (5 ft).
2. Frogspawn is usually laid in clumps, whereas toadspawn is usually laid in long strands.
3. A curious Mexican salamander which never reaches true adulthood, and even breeds while still in the larval stage.
4. The South African sharp-nosed frog has been recorded jumping a distance of 3 m (nearly 10 ft) in a single leap.
5. Three: common, palmate and crested.
6. Because it carries its eggs around on its back until they are ready to hatch.

XVIII

SNAKES

1. **Name the most venomous snake in the world.**
2. **Can a snake blink?**
3. **Name the only venomous snake in the British Isles.**
4. **What is 'sloughing'?**
5. **What is the age of the oldest known snake: 20 years, 40 years, 50 years or 60 years?**
6. **Which is the shortest snake in the world?**

ANSWERS

1. A seasnake of the genus Hydrophis. Its venom is 100 times more potent than any other snake's.
2. No. The eyelids form a fixed, transparent covering over the eye.
3. The adder.
4. Sloughing is the process by which the snake sheds its skin.
5. 40 years.
6. The thread snake, which is found on some islands in the West Indies. The longest measured was only 10.8 cm (4.25 in). A thread snake of this size can glide through a 0.3 mm hole-about the size of the hole in a pencil after the lead is removed.

XIX

FAMOUS INVENTIONS

1. What did Alessandro Volta invent in 1800?
2. Where and when was the telescope invented?
3. Which invention was first used to fasten boots and shoes?
4. When were stereo records first released?
5. What did Lasalo Biro invent in 1938?
6. Which invention did Mark Twain become the first famous author to use?
7. Who invented pneumatic (inflatable) tyres?
8. Where and when did the first colour television service begin?
9. Which invention was made by Joseph Swan and also by Thomas Edison?
10. What was invented solely for the use of King Louis XV of France?

ANSWERS

1. The Electric battery.
2. Holland, 1608.
3. The zip fastener.
4. 1958.
5. The ball-point pen.
6. The typewriter.
7. John Boyd Dunlop.
8. The United States, 1951.
9. The electric light bulb.
10. The lift or elevator.

XX

MEDICINE

1. Which operation was pioneered by Christiaan Barnard in 1967?
2. Who discovered that blood circulates round the body?
3. What is an analgesic?
4. Which kind of surgery can restore or improve a patient's appearance?
5. What is the common name of the disease that doctors call rubella?
6. A,B,AB and O - what are they?
7. Which kind of people are treated by pediatricians?
8. Which part of the body is affected by conjunctivitis?
9. What does a pharmacist do?

ANSWERS

1. Hearttransplant.
2. William Harvey.
3. A painkiller, such as aspirin.
4. Plastic surgery.
5. German measles.
6. Blood groups.
7. Children.
8. The eye.
9. Prepares and dispenses drugs.

XXI

SPACEFLIGHT

1. **Who was the first American astronaut to orbit the Earth?**
2. **What was the first animal to make a spaceflight?**
3. **Where did the Viking space probes land?**
4. **How far away does space begin?**
5. **What is Intelsat?**
6. **What was unlucky about Apollo 13?**
7. **What are Columbia, Discovery, Challenger and Atlantis?**
8. **American astronauts have spent the longest time in space-true or false?**

ANSWERS

1. John Glenn.
2. A Russian dog called Laika.
3. On Mars.
4. About 160 Km(100 miles) above your head.
5. The International Telecommunications Satellite Consortium, and the name of satellites launched by it.
6. It was a Moon mission that went wrong-the astronauts had to abandon their Moon landing but returned safely to Earth.
7. Names of space shuttles.
8. False; russian cosmonauts have spent about four times as long.

XXII

FOOD

1. What is a Welsh rabbit or rarebit made from?
2. How long does your body take to digest an apple?
3. What do you add to food when you season it?
4. What is the general name for foods such as spaghetti, macaroni and ravioli?
5. What does vinaigrette sauce contain?
6. If you garnish a dish, what do you do to it?
7. Which expensive food consists of fish eggs?
8. How hot should oil be to cook chips or french fries?
9. What is sauerkraut?

ANSWERS

1. Cheese and toasted bread.
2. About an hour and a half.
3. Pepper and salt, plus other flavourings.
4. Pasta.
5. A mixture of oil, vinegar and spices.
6. Decorate it.
7. Caviare.
8. About 180° F (82°C).
9. Pickled cabbage.

XXIII

FAMOUS STRUCTURES

1. How many spectators can cram into the world's largest stadium?
2. How high is the world's tallest structure?
3. Where is the Eiffel Tower?
4. How many rooms are there in the world's biggest hotel?
5. What is crossed by the world's longest bridge?
6. Where would you find the Empire State Building?
7. Which famous structure stretches from the Atlantic Ocean to the Pacific Ocean?
8. Where is the tallest tower in the world?

ANSWERS

1. 240,000 - in the Strahov Stadium, Prague, Czechoslovakia.
2. 646m (2,121 ft) - its a radio mast in Poland.
3. Paris, France.
4. 3,200 - at the Hotel Rossiya, Moscow.
5. Lake Pontchartrain, Louisiana, USA; it's 38.4 Km (nearly 24 miles) long.
6. New York City.
7. Panama Canal.
8. Toronto, Canada.

XXIV

SPORTS

1. What is the real name of Pele, the Brazilian footballer?
2. How long is a marathon?
3. What is the maximum break in snooker?
4. What is the Cresta Run?
5. What sport is associated with the Queenbury Rules?
6. Which country has won the greatest number of medals in the olympics?
7. What is a clean and jerk?
8. How often does the Ryder Cup professional golf match take place?
9. In lugeing, does the rider lie on his front or back?

ANSWERS

1. Edson Arantes do Nascimento.
2. 42.95 Km (26 miles 385 yds)
3. 147.
4. Toboggan course in Switzerland.
5. Boxing.
6. USA.
7. Type of lift in weight-lifting
8. Every two years.
9. Back.

XXV

MACHINES AND INDUSTRY

1. When was the first practical steam engine invented?
2. Which organization employs the most people in the world?
3. Where and when was the first nuclear power station built?
4. Which machine was the first to have automatic control?
5. Where was the first hydroelectric power station?
6. Which country produces the most cars?
7. What goods were first manufactured by mass production and when?
8. Which is the world's largest computer company?

ANSWERS

1. In 1700.
2. Indian Railways.
3. Russia, 1954.
4. The wind mill-with the invention of the fantail in 1745.
5. At Niagara Falls in the United States.
6. Japan.
7. Muskets, 1801
8. International Business Machines Corporation (IBM).

XXVI

HISTORY OF TRANSPORT

1. Where and when was the first city bus service?
2. What was the name of the biggest ocean liner ever built?
3. In which country were the first railways built?
4. Where and when did the first helicopter fly?
5. Who invented the petrol-driven motorcar and when?
6. In which city was the first underground railway constructed?
7. What was the first self-propelled transport?
8. Which is the most popular car in history?

ANSWERS

1. Paris, France, in 1662 (horse-drawn).
2. Queen Elizabeth (destroyed by fire in 1972).
3. Britain.
4. France, 1907.
5. Karl Benz in Germany, 1885.
6. London, in 1863.
7. A paddle steamer built in France in 1783.
8. The Volkswagen Beetle, of which more than 20 million have been built.

XXVII
FAMOUS EXPLORERS

1. In order to attract settlers, what name did Eric the Red give the island he discovered in 980?
2. Which 13th-century Italian explorer travelled through Persia, Ceylon, India and China?
3. What continent did Christopher Columbus think he had reached when he crossed the Atlantic Ocean?
4. What did Vasco Nunez de Balboa discover when he crossed the Panama in 1513?
5. Who was the first explorer to sail round the world?
6. Who discovered Tasmania and New Zealand in 1642?
7. Who discovered Africa's Victoria Falls in 1855?

ANSWERS

1. Greenland.
2. Marco Polo.
3. Asia; it was actually the West Indies.
4. The Pacific Ocean.
5. Ferdinand Magellan.
6. Abel Tasman.
7. David Livingstone.

XXVIII

PEOPLE AND PLACES

1. **What event does France celebrate on July 14?**
2. **America was named after an explorer. What was his name?**
3. **Which American film star became a princess by marrying the ruler of Monaco?**
4. **Ireland is divided into four provinces. What are they?**
5. **Of which country was Juan Peron twice president?**
6. **By what name was the Communist leader Josip Broz better known?**
7. **Which famous city was burned in 1666?**
8. **Which French palace is famous for its Hall of Mirrors?**

ANSWERS

1. The Fall of the Bastille.
2. Amerigo Vespucci.
3. Grace Kelly.
4. Ulster, Munster, Leinster, Connacht.
5. Argentina.
6. Tito (he ruled Yugoslavia 1945-1980)
7. London.
8. Versailles.

XXIX

FICTIONAL CHARACTERS

1. **What is the name of the villainous pirate in Treasure Island by Robert Louis Stevenson?**
2. **Who are Meg, Jo, Beth and Amy?**
3. **What is the name of the fairy in J.M. Barrie's story, Peter Pan?**
4. **In Rudyard Kipling's The Jungle Book, who was the boy who was brought up by wolves?**
5. **What are the names of The Three Musketeers in Alexander Dumas's book?**
6. **What do the main characters of these books have in common: National Velvet by Enid Bagnold, Black Beauty by Anna Sewell, and My Friend Flicka by Mary O'Hara?**
7. **What is the first name of Gulliver in Swift's book, Gulliver's Travels?**

ANSWERS

1. Long John Silver.
2. Characters in Little Women by Louisa May Alcott.
3. Tinker Bell.
4. Mowgli.
5. Athos, Porthos and Aramis.
6. They are all horse.
7. Lemuel.

XXX

POTLUCK

1. **Which artist produced the series of paintings known as The Rake's Progress?**
2. **Which city is famous for its shell-like opera house?**
3. **In what sport was Don Bradman famous?**
4. **Which country won the Russo-Japanese War of 1904-1905?**
5. **What and where is Big Ben?**
6. **What famous battle began on October 23, 1942?**
7. **The cor anglais is neither English nor a horn. What is it?**
8. **For 123 years British rulers were also rulers of a German state. What was its name?**

ANSWERS

1. William Hogarth.
2. Sydney, Australia.
3. Cricket.
4. Japan.
5. Big Ben is the bell in the Clock Tower of London's Houses of Parliament (and not the whole clock).
6. The Battle of Alamein, in North Africa.
7. An alto oboe.
8. Hanover.

XXXI

MUSICAL MATTERS

1. Who was Robin Hood's Minstrel?
2. How many symphonies did Johannes Brahms write?
3. What song did Bill Haley and the Comets make famous?
4. What song did Claude Joseph Rouget de Lisle write in 1972?
5. In which film and stage musical did the song 'Gee, Officer Krupke' occur?
6. What is the difference between the reeds of an oboe and a clarinet?
7. Who wrote the music of The Beggar's Opera?

ANSWERS

1. Alan A 'Dale.
2. Four.
3. 'Rock Around the Clock'.
4. The Marseillaise, the national anthem of France.
5. West Side Story.
6. Oboe has double reeds, Clarinet a single reed.
7. No one person: in 1728 the organist Dr John Pepusch arranged English and Scottish folk tunes, popular songs of the day, and a fewtunes by Purcell and Handel.

XXXII

SPORTS

1. **Who ran the first mile in less than four minutes, and in which year?**
2. **What are the five events in the women's pentathlon?**
3. **An eight is a boat used in rowing races. How many people are in it?**
4. **In boxing, which is lighter, featherweight or bantamweight?**
5. **What sport was derived from an Iroquois Indian game called baggataway?**
6. **If you had birdie, a bogey and an eagle, what game would you be playing?**
7. **What is a chukker, and in which game would you encounter it?**

ANSWERS

1. Roger Bannister in 1954.
2. Long jump, high jump, shot-put, 80-m hurdle race, 200-m race.
3. Nine, including the cox.
4. Bantamweight.
5. Lacrosse.
6. Golf.
7. A period of play in polo.

XXXIII

FAMOUS WRITERS

1. Who were the three sisters who became famous English novelists?
2. William Sydney Porter was a famous American short-story writer. What pen name did he use?
3. Who wrote the Just So Stories?
4. Who invented the fictional detective, Hercule Poirot?
5. Which English dramatist and poet was born at Stratford upon-Avon in 1564?
6. What was the name of the nine-year-old girl who wrote The Young Visiters?
7. The author of Black Beauty was a campaigner against cruelty to horses. What was her name?
8. Who wrote The Hobbit?

1. The Bronte sisters.
2. O. Henry.
3. Rudyard Kipling.
4. Agatha Christie.
5. William Shakespeare.
6. Daisy Ashford.
7. Anna Sewell.
8. J.R.R. Tolkien.

XXXIV
INVENTIONS

1. Who was 'the Wizard of Menlo Park?
2. King Camp Gillette made an important invetion in 1885. What was it?
3. Who made the first working television set?
4. Hero of Alexandria invented the aeolipile in about AD 100. What was it?
5. Who had the first central heating systems?
6. Who invented the telephone, and in which year?
7. In which country was paper first made?
8. What important invention did Whitcomb L. Judson first demonstrate in 1893? (A clue: it's to do with clothes.)

ANSWERS

1. Thomas Alva Edison, who produced more than 1,000 inventions.
2. The safety razor.
3. John Logie Baird.
4. The first known steam engine.
5. The Romans.
6. Alexander Graham Bell in 1876.
7. China, in about AD 105.
8. The zip fastener.

XXXV

TRANSPORT

1. **Which important part of a vehicle was invented in 1845, and reinvented in 1888?**
2. **What was the Graf Zeppelin?**
3. **What was the name of the submarine that made the first under-the-ice crossing of the North Pole?**
4. **Who were the brothers who made the first balloon to carry a man aloft?**
5. **What is the name of the rail link between Moscow and Vladivostok, on the Pacific coast?**
6. **What did Gottlieb Daimler and Karl Benz do in 1885?**

ANSWERS

1. The pneumatic tyre (invented by Robert William Thomson in 1845, forgotten and reinvented by John Boyd Dunlop in 1888).
2. A German airship, in service from 1928 to 1937.
3. USS Nautilus.
4. Jacques and Joseph Montgolfier.
5. The Trans-Siberian Railway.
6. They built the first petrol-driven motor-cars.

A-Z QUIZ

1. Who wrote about the Jabberwocky?
2 What is a 'Kentucky Pill'?
3 Where is the 'Land of the White Eagle'?
4. What does MS stand for?
5. What is a Naiad?
6. Who hid from his enemies in an oak tree?
7. What is a palindrome?
8. What is another name for Quicksilver?
9. What name is given to the sign of the ram in the zodiac?

ANSWERS

1. Lewis Carroll.
2. A bullet.
3. Poland.
4. Manuscript.
5. A water nymph.
6. Charles II.
7. A word which reads the same when read either backwards or forwards.
8. Mercury.
9. Aries.

1. **What is an abigail?**
2. **The Gloucestershire home of the Dukes of Beaufort gave its name to a game. Can you name it?**
3. **What is the name of a song sung in Trinidad, often to the accompaniment of steel bands?**
4. **What was 'Dagger Money'?**
5. **Which country has the white-headed eagle as its emblem?**
6. **Who wrote The Fair Maid of Perth?**
7. **Who is the god of war, according to ancient Rome?**
8. **In heraldry, what colour is gules?**
9. **Who has the motto: Ich Dien?**

ANSWERS

1. A lady's maid.
2. Badminton.
3. Calypso.
4. The sum once paid to judges on the legal Circuit to purchase weapons as a protection against robbers.
5. The United States of America.
6. Sir Walter Scott.
7. Mars.
8. Red.
9. The Prince of Wales.

1. **Who is the patron saint of travellers?**
2. **What is the 'Third Estate'?**
3. **Who was the first person to use an umbrella in Britain?**
4. **By what name is Van Dieman's Land now known?**
5. **What is wampum?**
6. **What kind of musical instrument is a xylophone?**
7. **What is the song of the Yellowhammer?**
8. **What are the Zingari?**

ANSWERS

1. St. Christopher.
2. The House of Commons.
3. Jonas Hanway.
4. Tasmania.
5. Shell bead money used by the North American Indians.
6. A percussion instrument.
7. "A little bit of bread and no cheese."
8. This is the name given to gypsies in Italy.

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